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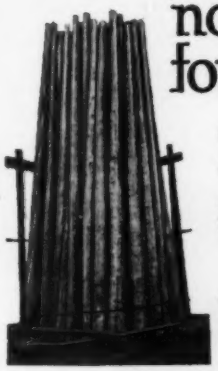

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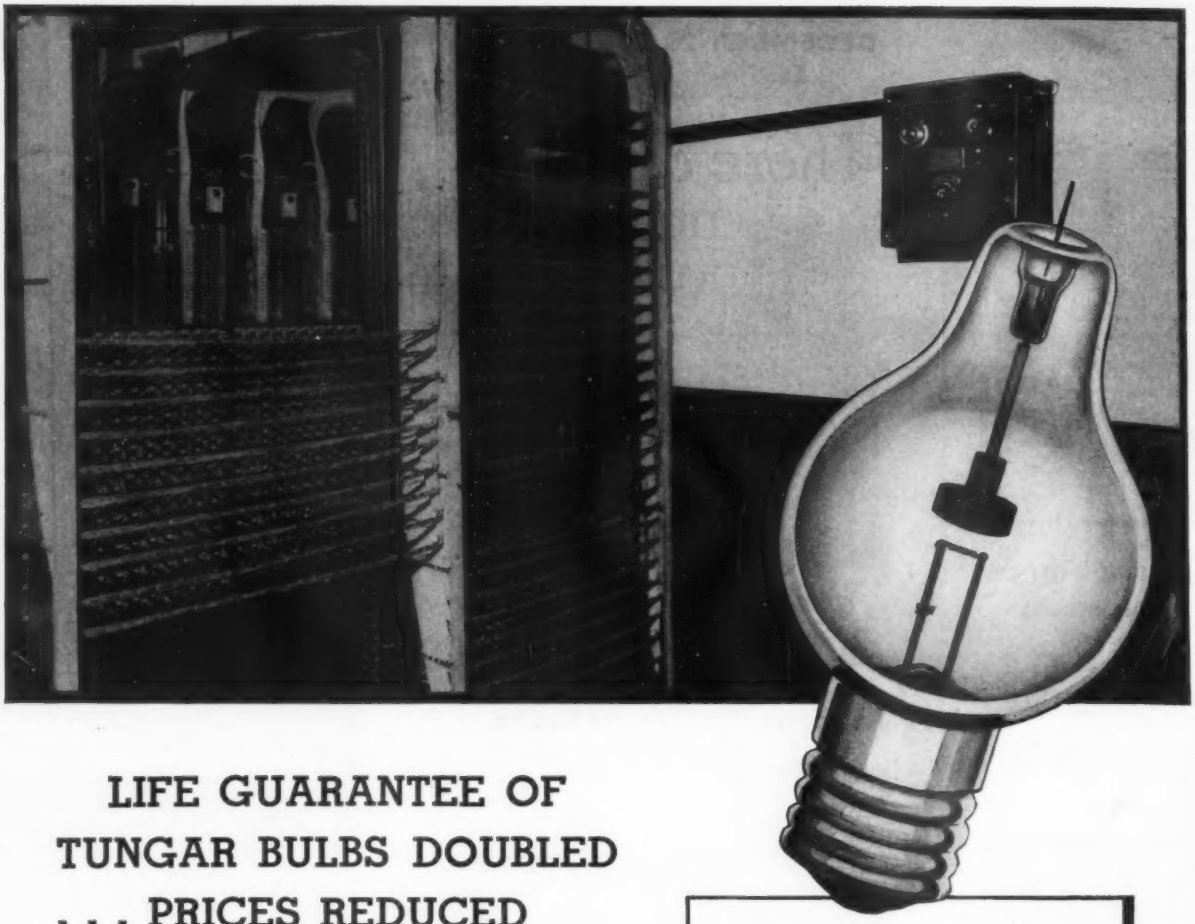

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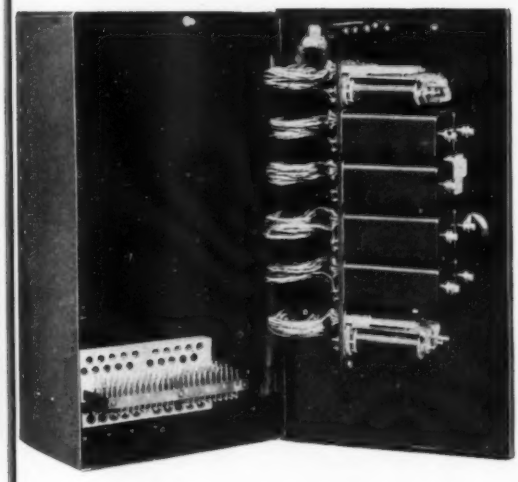

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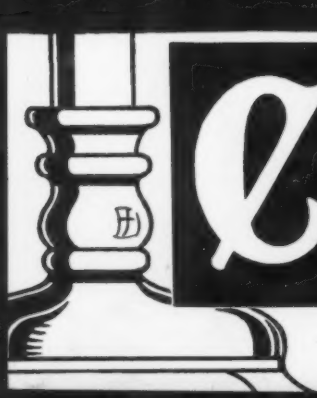

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Telephony

DECEMBER 26, 1936 VOLUME 111, NUMBER 26

Anticipating Force Requirements

By L. F. SHEPHERD

General Traffic Superintendent,
Central Operating Companies of the General Telephone System, Madison, Wis.

APPLICATION of force-planning program for determining future force requirements in comparatively small offices. Data based on previous traffic trends, tempered by judgment as to variable factors, used to establish weekly forecasts made 16 weeks in advance and revised four weeks in advance. Results of planning are improved service at lower cost, with wage increases for employes. Address before annual traffic conference of The Illinois Telephone Association

AN ORGANIZED force-planning program is generally accepted as a phase of traffic management that can be successfully applied only in offices having a large traffic force and where force adjustment is supervised by people specially trained in force engineering work. If force planning is a desirable practice to follow in managing large offices, it is only reasonable to assume that some benefit will be derived by the application of certain essential phases of force planning for smaller offices; namely, offices having three or more positions occupied during the busy hour, or exchanges having more than 750 stations.

It may be difficult to visualize the accomplishment obtainable through planned force regulation at offices of this size, but experience with force planning has indicated that some form of force regulation is necessary in order to maintain satisfactory service at a cost consistent with the volume of traffic offered to the operating force.

Anticipating future force requirements is the process of predicting the volume of future traffic sufficiently in advance so that arrangements can be made to provide the proper operating force when the period for which the forecast is made is at hand. Forecasts predicated on judgment alone are not likely to be very accurate.

Data based on previous traffic trends should be available so that the forecasts may follow, to some extent, the previous traffic performance for corresponding periods. Originating local calls per day and originating toll calls per day serve as the basis for determining the volume of work for which the operating force should be provided.

Need for a Traffic Unit

Inasmuch as there is a vast difference between the operating time per originating toll call and the operating time per originating local call, both classes of originating calls should be equated to a unit basis. Equating calls to a unit basis makes it possible to give the office full credit for operating work to be performed on all classes of traffic.

A traffic unit is considered as the operating time required to complete a local-to-local connection on a manual-ringing, common battery switchboard, by an operator of average experience, using an operating method requiring complete repetition of the called number. The unit represents 15.65 seconds of time and includes an allowance of 10.17 seconds of work time and 5.48 seconds of idle time.

The idle time is allowed for overlap operations such as ringing, supervising and disconnecting, and a portion of the idle time is available so that the operator may exceed her normal load during periods of peak traffic. Thus it follows, 3,600 seconds (1 hour), divided by 15.65 seconds will show that an average operator can handle 230 units per hour; and, if necessary, a load of 245 units per hour may be carried, providing the loads for the preceding and succeeding hours do not exceed 230 units.

Using the unit as a basis, the work time for various types of calls can be determined by applying a coefficient which is a ratio between the operating time for handling the type of call involved and one unit.

A typical exchange of 2,000 stations has been selected as a representative office for the purpose of explaining a method for anticipating future force requirements. By the application of standard equating methods to the traffic offered at this office, it has been found that one originating local call represents .83 of a unit or a local coefficient of .83, and one originating toll call represents 25.9 units or a toll coefficient of 25.9. These coefficients are checked quarterly each year and will vary depending upon the characteristics of the traffic being handled.

In exchanges of this size there is only one night operator provided, which makes it necessary for her to handle both the local and toll traffic offered during the night hours. Operators working on Sunday and during periods of light traffic on week days will also be required to handle both local and toll traffic. The switchboard equipment should be so arranged as to permit the operators working on universal positions to team with the local or toll operating force and handle local, rural, or toll traffic, thereby reducing idle operating time.

It seemed desirable, therefore, to consider the total operating work for the office as available to the entire operating force rather than to recognize a division of two separate operating forces; one to handle local and the other to handle toll, with no overlapping of responsibilities between the two. In order to gain the full advantage of this combined force arrangement, it is necessary that each operator be capable of handling both local and toll traffic, thus affording a flexible force.

The first efforts in instituting a force-planning program in offices of this size were directed along the lines of preparing estimates for future force requirements three months in advance and adjusting the operating forces to care for normal seasonal requirements. In view of the fact that the load-carrying possibilities of the office had not been determined, it was necessary to reduce the operating hours, thereby increasing the load to a point which indicated that further force reduction on this basis would have an adverse effect on service.

This procedure was followed without much consideration as to the ability of the operating force, since it appeared that the operators were of average experience and improved methods would not be required to carry the objective load.

Operator Load Increase Result of Weekly Forecasting

With more knowledge and experience in force planning, it was apparent that the load could be increased by taking further advantage of traffic fluctuations. The program was then changed to a plan of estimating future requirements on a weekly basis, and adjusting the operating force day by day to handle the traffic being offered.

Weekly forecasting and adjusting operating forces on a day-to-day basis immediately reflected a greater overall load without any unfavorable effect on service. It also appeared that a still higher load could be carried and service materially improved by increasing the operators' efficiency. These indications directed attention to the need for training the operating force to a maximum efficiency; therefore, considerable time was spent in a retraining program.

Inasmuch as the load performance of an office is entirely dependent on the provision of the proper operating force, an operators' hourly schedule was prepared on the basis of minimum requirements. The schedule included supplementary tricks which could be added to the basic minimum schedule to care for increased traffic.

The chief operator was made responsible for the provision of additional operating time necessary to handle increased traffic, and she likewise would be responsible for reducing her operating force when traffic receded. This adjustment in her force is accomplished by the use of supplementary tricks provided for in the operators' hourly schedule.

It is recognized that traffic fluctuates in relation to business activity, thereby developing traffic characteristics which must be taken into consideration when determining requirements for an individual office. There may be local conditions which have a very definite bearing on traffic offered during periods of the day and during certain days of the week; also, certain conditions may affect the volume of traffic during various months of the year.

Influence on Traffic of Seasonal Business

By anticipating these fluctuations, arrangements can be made in advance to provide a force sufficient to handle normal expected increases or decreases in traffic, thus maintaining adequate service at all times, regardless of the volume of traffic offered.

Frequently, the presence of certain business activities in a community will influence the volume of traffic being offered. This is particularly true in offices serving business concerns such as grain brokers, market associations, mining companies, fruit growers, educational centers, resorts, or other concerns where the nature of the business is seasonal, with the result that the volume of traffic will fluctuate according to business activity. A review of previous traffic records will, no doubt, indicate the normal changes which may be expected, so that future requirements can be anticipated with a reasonable degree of accuracy.

With knowledge of these factors, the chief operator has credible assurance of conditions she may expect to encounter within the immediate future. She should take full advantage of the forecasts and arrange vacation schedules and training periods sufficiently in advance so that the proper force is available to handle expected traffic.

Assuming that in an exchange of this size the operators will work on the basis of 48 hours per week, which is equivalent to six days per week, it is not difficult to calculate the relief force which must be available so the regular operators will not work in excess of their regular work week. A review of past experience will indicate that a certain amount of relief time must be provided to care for the absences of regular operators and that a number of force losses due to resignations or dismissals may be expected.

Major Responsibilities of Chief Operator

It is essential that anticipated losses be kept in mind when determining future force requirements. The chief operator, by keeping in close contact with her operating force, should have advance knowledge of an anticipated loss so that a trained operator will be available when the actual loss occurs.

Because two exchanges are of a similar size, it should not be assumed the traffic is comparable. The calling rate is the factor which determines the volume of traffic offered. It would, therefore, be unfair to compare traffic results on a station basis. A comparison of offices on a traffic unit basis will afford a more equitable result, because a traffic unit involves the same amount of operating time, regardless of other characteristics individual to the various offices.

Neither does the similarity in size indicate the operating forces should be able to carry the same objective load. Equipment arrangement, board spread, and operators' efficiency must all be taken into consideration in determining an objective load. In order to secure good overall performance, supervisory and auxiliary time must be kept at a minimum.

To accomplish a reduction in central office clerical time, the chief operator may assign the responsibility of rating and sorting toll tickets, checking multiple markings, and

other clerical work incidental to maintaining central office records, to the night operator. By delegating a part of her clerical responsibilities to the night operator, the chief operator will have more time available for supervision and training and can be scheduled to work at the switchboard when the occasion demands.

Up to this point, the discussion has dealt largely with factors relating to information and data essential in a force-planning program. Whether the actual forecasts for the office are developed by the chief operator or prepared at a central point and forwarded to her for guidance, she has two major responsibilities:

1. To recognize the value of force planning and understand what is to be accomplished by the program.

2. To assume her responsibility of adjusting her force as traffic conditions demand and provide the people required according to the forecasts, except in cases where her judgment dictates that alterations must be made in order to carry the objective load for the office.

An Adequate Program for the Smaller Offices

It has been found that weekly forecasts estimated 16 weeks in advance with revisions being made four weeks in advance will adequately serve as a program for anticipating future force requirements for the smaller offices.

The actual estimating of traffic requirements for 16 weeks in advance may be accomplished by reviewing the past performance and developing a ratio between the volume of actual traffic experienced for the 16-week period just completed, with the actual traffic experienced for the corresponding 16-weeks' period of the preceding year.

This ratio will indicate whether the average actual calls experienced per day for the 16-week period just completed were higher or lower than the average actual calls per day experienced for the corresponding weeks of the preceding year. This ratio of increase or decrease applied to the actual calls per day for the preceding year for the corresponding 16-week period for which the forecast is to be made, will give some indication of the volume of traffic to be expected in the future.

It is at this point that the person preparing the estimates must exercise some judgment to adjust the forecasts for future requirements, if it appears that the expected traffic will not equal the volume of traffic calculated by the use of the ratio previously developed. It may appear to the estimator that the actual traffic for certain weeks of the preceding year was not representative and that modification should be made to bring the estimate more nearly in line with the normal tendency for traffic to increase or decrease during this particular period of the year.

It should be understood that as the actual performance progresses along the period forecasted, revisions of the original estimates may be required. It is possible that the ratio on which the forecast was based might be increasing or decreasing to the extent that the actual performance would have a wide variation as related to the estimated requirements, thus rendering the forecast of little value.

In offices of this size, where volume of traffic is relatively small and force adjustment possibilities are limited, the original or revised estimate of average calls per day for a given month should be within 5 per cent of the actual traffic experienced. In many cases the variation will be less than 5 per cent.

If the estimated traffic is within 5 per cent of the actual traffic experienced, by careful management the chief operator should be able to maintain an actual load performance within 5 per cent of the objective load established for her office. The variation of 5 per cent is allowed, because it is impractical to adjust the total board hours, except in relation to the scheduled tricks.

The adjustments are made by adding or deducting the operating time for a section of a scheduled trick. The operating time adjustments will be in quantities of three, four, five, or eight hours, depending upon the

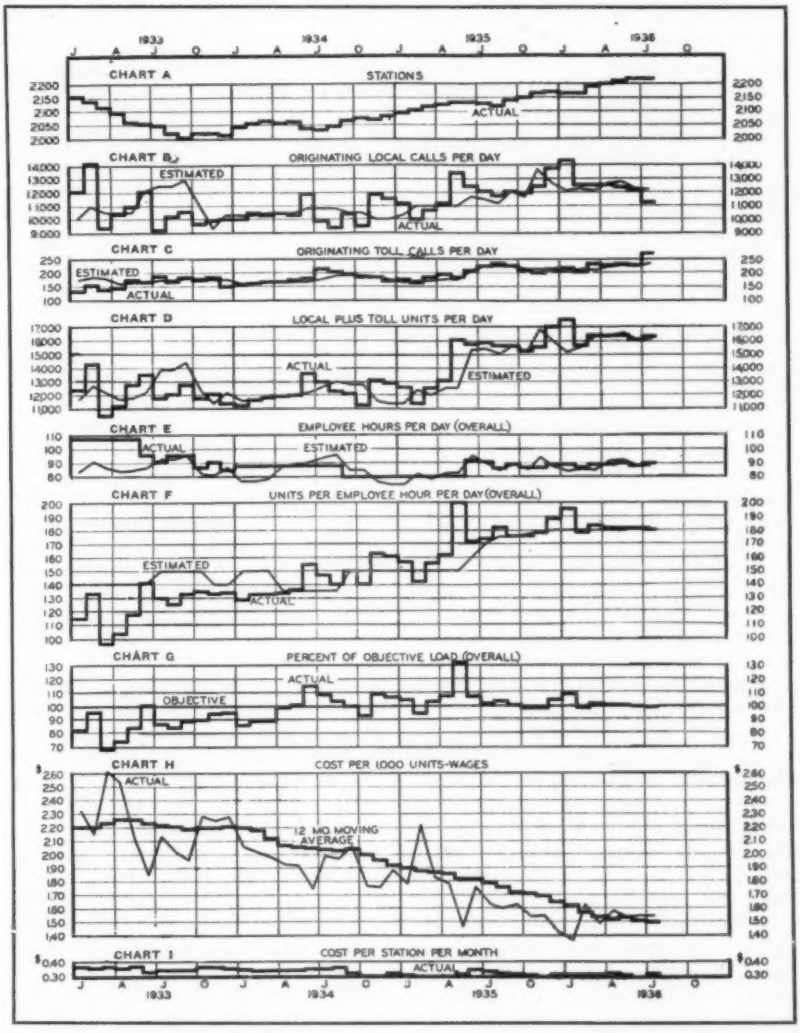


Fig. 1. Series of Charts Showing the Traffic Results for the Period January, 1933, Through July, 1936, for a Typical Exchange of 2,000 Stations.

amount of time needed and the arrangement of the trick for the period of the day to be affected by the adjustment.

Daily Records Basis for Future Forecasting

Inasmuch as originating local calls per day and originating toll calls per day serve as the basis for forecasting future force requirements, it is necessary to secure a record of actual originating traffic experienced per day for each forecast period.

Where a weekly force-planning program is in effect, a total day peg count of local originating calls is secured for one day of each week. A record of originating toll calls per day is obtained by taking an average of the originating toll calls for the five business days, Monday through Friday. The average actual overall hours used per day for the week is secured by taking an average of the overall hours used each day, Monday through Friday.

The actual load for the week is obtained by multiplying the originating local calls per day by the toll coefficient, adding the local and toll units together and dividing this total by the average actual overall hours per day as previously determined.

From supervisory and management viewpoints, it is desirable to have the traffic results summarized on a monthly basis. The average actual or originating toll calls per day and the average actual overall hours per day for each week are obtained as previously outlined. The average actual originating local calls per day is secured in a little different manner in order to give the office full credit for day-to-day traffic fluctuations and not require the office to take a total day local peg count each day of the week.

It is assumed that offices of this size are required to take a two-day local peg count each month. The two-day count should be taken on a Monday and Wednesday or a Wednesday and Friday of the first complete week in the month. It should be understood, of course, that a peg count should not be taken on holidays or days preceding or succeeding a holiday.

It will be assumed that the regular hourly peg count is taken on Monday and Wednesday of the first week of the month. The average of the total day originating local calls for the two days will serve as the basis for the actual local traffic offered per day, insofar as the force-planning program is concerned.

For the following week, a total day count of originating local calls on Tuesday will be used as the basis for actual originating local traffic for that week. The total day count for Thursday will be used for the third week and the total day count for Friday for the fourth week.

Where the greater part of five weeks is within a given month, a total day count for the fifth week will be taken on Wednesday. By this method, the office will receive a fair consideration for the traffic being offered each day.

For a better understanding of the effects of force planning, a series of charts has been prepared indicating the traffic results for a 3½-year period from January, 1933, through July, 1936, for a typical exchange of 2,000 stations. These are shown in Fig. 1.

The trend of station growth during this period is shown in Fig. 1-A. Fig. 1-B shows the average actual originating local calls per day and the estimated originating local calls per day. It will be noted that the bank moratorium in March, 1933, effected a marked decrease in the number of local originating calls; also, that there has been an increase in the number of local originating calls since July, 1933.

The actual originating toll calls per day, also the estimated originating toll calls per day for this period, are given in Fig. 1-C. The relationship of the estimated toll calls to the actual toll calls is closer than that experienced in estimating the local traffic. This is due largely to the fact that toll traffic does not fluctuate at this office in the same corresponding ratio as does the local originating traffic.

The fourth chart (Fig. 1-D) shows the actual local plus toll units per day and the estimated local plus toll units per day. The total estimated and actual units represented are developed from the estimated and actual originating local and toll calls previously indicated, equaled to a unit basis.

The actual and estimated employe overall hours per day are shown in Fig. 1-E. During the first part of 1933 this office was using an average of 108 employe hours per day to handle approximately 12,000 units of work. From January, 1933, to June, 1935, force planning was on a monthly basis, requiring adjustments in the operating force to handle only seasonal fluctuations.

Beginning with June, 1935, the force-planning program was changed to a weekly basis, requiring the operating force to be adjusted day by day as traffic conditions required. It should be noted that in July, 1936, this office was using an average of 90 hours per day to handle approximately 16,000 units of work, or an increase of 4,000 units of work over the first part of 1933 with 18 hours per day less operating time than was used during 1933.

The sixth chart (Fig. 1-F) shows the actual and estimated overall units per employe hour per day. The estimated overall units per employe hour per day is commonly known as the overall objective load. The benefits of force planning are clearly represented by the improvement in the actual overall load. The ability of the force to carry a greater load and adjustments in the operating force on a day-to-day basis, thereby eliminating excess operating time, are responsible for this improvement.

During the first part of 1933, this exchange was carrying an actual overall load of approximately 115 units per employe hour with an objective overall load of 140 units per employe hour. During 1936, the office has carried an actual overall load of approximately 184 units per employe hour and has an objective load of 180 units per employe hour.

The per cent the actual overall load is of the objective load is shown in Fig. 1-G. This chart indicates the better load performance resulting from the use of a weekly force-planning program rather than a monthly force-planning program.

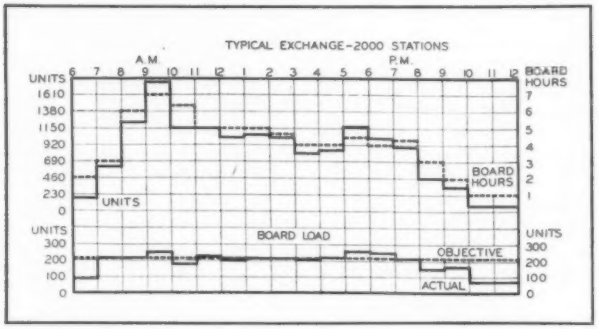


Fig. 2. Chart Showing Hourly Distribution of Units, Board Hours and Board Load, on a Week Day.

The weekly force-planning program was placed in effect during June, 1935. Since that time, in only two months (June, 1935, and February, 1936) did the actual overall load vary more than 5 per cent from the objective overall load.

The eighth chart (Fig. 1-H) shows the cost of operators' wages to handle 1,000 units of operating work. Two curves are shown; one to represent the actual cost per 1,000 units for each month, and the other to represent the actual cost per 1,000 units on the basis of a 12 months' moving average.

This chart is particularly valuable because it represents, in dollars and cents, the actual benefits which accrue to a reduction in operating costs through the use of an organized force-planning program. During 1933, the average cost per 1,000 units was approximately $2.22.

By anticipating future force requirements and intelligent force management, this cost has been reduced to an average of $1.55 per 1,000 units during the first part of 1936.

The reduction in operating time accomplished through a force-planning program has not had an adverse effect on service; on the contrary, service has improved, and a consistent grade of service is being furnished at all times because the operating force is provided on the basis of the traffic being offered.

In Fig. 1-I the traffic costs per station per month of operators' wages are shown. The effect of force adjustment has reduced the cost per station per month from an average of 36 cents per month during 1933 to an average of 31 cents per month during 1936.

It is true that the total traffic payroll per month for this office in 1936 is less than in 1933; however, actual wages per employe hour have increased, indicating that the force-planning program manifested benefits not only to the company but to the employes as well. The company enjoyed an improvement in service at a lower cost and the employes received an increase in wages.

A second series of charts has been prepared to demonstrate weekly distribution of units, the provision of switchboard hours and the resulting hourly board load; also charts showing traffic fluctuations by months, with overall hours required above the basic schedule, together with a chart showing traffic fluctuations by days and a provision of overall hours required to handle the traffic for a typical exchange of 2000 stations.

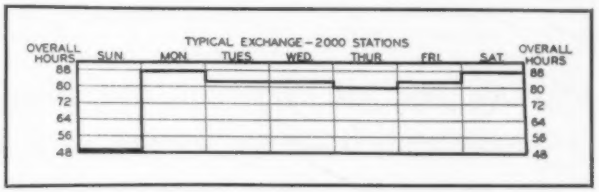


Fig. 4. Chart of Traffic Fluctuations by Days, Showing Overall Hours Required (Objective Overall Load 180 Units).

The first chart (Fig. 2) shows the amount of traffic in total units offered each hour of the day and the number of board hours provided to handle the traffic offered. In other words, it represents a basic operators' schedule and the actual hourly board load carried by the operators working according to the schedule.

The objective board load is shown as 210 units per operator hour which will allow the overall objective load to be established at approximately 180 units per employe hour. The difference between the objective board load and the overall objective load is explained by the fact that the board load represents the amount of work in units divided by the board hours, while the overall load represents the amount of work in units divided by the total hours for the office, which includes auxiliary and supervisory time.

In Fig. 3 are shown traffic fluctuations by months. It indicates in overall hours to what extent these fluctuations influence the provision of hours above the basic schedule for the various months of the year. It should be noted that the greatest number of operating hours will be required during the months of May, June, and July, and the fewest operating hours will be required during the month of October.

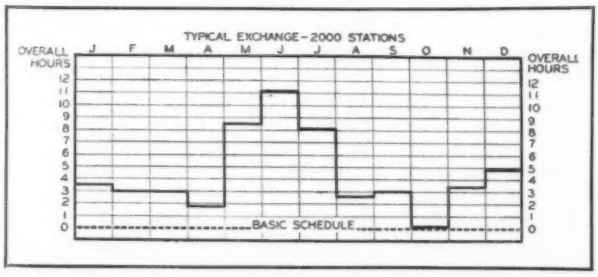


Fig. 3. Chart of Traffic Fluctuations by Months Showing Overall Hours Required Above Basic Week Day Schedule (Objective Overall Load 180 Units).

When preparing estimates for future force requirements, this chart is very valuable because it indicates traffic fluctuations which can be expected and the periods during which the fluctuations occur. Because of increased traffic during May, June and July, no vacations should be scheduled for these three months as traffic will require a maximum force during this period.

Traffic fluctuations by various days of the week and overall hours required for each day of the week are shown in Fig. 4. It should be understood that this represents average fluctuations, and traffic will not increase or decrease in exactly the manner indicated. It is known, however, that Monday and Saturday traffic will be greater as a general rule than the traffic offered on Tuesday, Wednesday, and Friday. The traffic offered on Thursday will be lower than any other week day.

During a normal week, the chief operator can plan on traffic requiring four hours less operating time on Tuesday, Wednesday, and Friday than will be required for Monday and Saturday. Likewise, she can plan on providing four hours less operating time on Thursday than is provided on Tuesday, Wednesday, and Friday.

The individual operators affected by the adjustments are generally the new operators who are considered as relief operators and who have not been assigned a regular trick to be worked each day.

Ohio Bell's Expansion and Improvement Plan

The Ohio Bell Telephone Co. in 1937 will spend approximately $15,000,000 in an expansion and improvement program.

Approximately $11,175,000 will be spent on new exchange equipment. Included in this is $7,685,000 for new telephones and $2,780,000 for new dial equipment.

About $2,155,000 is to be used for outside plant equipment, including $1,525,000 for local service lines and $630,000 for long distance lines.

Purchase of land and new building construction will entail $593,000, while it is estimated that $390,000 will be required for furniture, automotive vehicles and tools.

IN THE NATION'S CAPITAL

By FRANCIS X. WELCH

Special Washington, D. C., Correspondent for TELEPHONY

YEAR 1936 AN EVENTFUL ONE; most significant happening in telephone industry not in Washington but throughout country, generally—economic recovery. The FCC, rate reductions and investigation of Bell System. Prestige of FCC improved in year.

"NOW the New Year reviving old desires," remarked the poet, Omar Khayyam, "the thoughtful soul to solitude retires." And so it is, as the doubly festive season of the Yuletide draws near. There comes to each of us a natural desire to take inventory of our affairs—social, business and domestic—and to make comparison with the corresponding period of the preceding year.

For the telephone industry, the year 1936 has been eventful. It may not turn out to be half as eventful as the year 1937 but that, as Kipling would say, is another story reserved for another telling. Glancing back over 1936, it becomes immediately obvious that the most significant happening to the telephone industry took place, not in Washington, D. C., but throughout the country at large—in short, economic recovery.

This in itself is a verity too often lost sight of in the welter of discussion of what is going on in Washington. It used to be the same way about New York back in the old days when Wall Street was the real business news center and Washington took orders.

It was then that business men neglected their businesses in the interest of the stock market, confusing Cause with Effect and failing apparently to realize that manipulations on the stock exchange have no more effect on real business conditions than tinkering with a thermometer has on the state of the weather.

TODAY, there is danger that Washington, D. C., may assume a similar position of false importance in the minds of business men who are sincerely anxious about their business. Washington makes news; it makes a great deal of noise, and does a considerable number of things that have an important effect on all business, but just the same the most significant event that happened to the telephone business in 1936, happened right in your own cashier's office—not in Washington.

Of course, one may believe that economic recovery is a result of what has been going on in Washington. On the other hand, one may also point to England, which is farther ahead than we are on the road to recovery without such intense governmental activity in the field of economics. That is a question of political belief. Either way, it does not alter the fact that business men are well advised if they mind their business without wasting too much time or anxiety on the endless bickering in the nation's capital.

THE PROPER and necessary contacts between you and Washington will be well taken care of—by Washington. You don't have to worry about that. The postman will always ring twice and the tax collector will always show up on time. In addition to this, smart business men follow Washington carefully but—and this is important—they always take Washington with many grains of salt.

It is well to remember that there is nothing done in Washington that cannot be undone, and often is. No one law, no one Congress, and no one Administration is so important that it can "make or break" business. Presidents come and Presidents go, but business goes on as usual—maybe under different rules, but it will likely be found at the same old stand.

With this limitation in mind, let us look back on 1936 to see what happened in Washington of interest to the telephone industry. Bulking large in the picture, of course, is the special Bell investigation. So far it has cost $1,150,000, or will have cost about that much by the end of next month. Has it been worth it?

A statement recently issued by the FCC calls attention to the fact that long distance rate reductions totaling $22,000,000 have been made by the Bell since the investigation started. That is not only false inference but a false standard for judging the value of such an investigation.

It is perfectly understandable, of course, and nobody blames the FCC for plugging its own job as much as possible, any more than Independent telephone plant operators blame state commissions for bragging about local rate reductions in their annual reports to the legislatures. It's only to be expected.

MOST OR ALL of the recent long distance rate reductions by the Bell would probably and eventually have been made whether there was a special investigation or not, just as numerous telephone rate reductions (local and long distance) have been made from time to time in the past, before the FCC was even created. However, it is not unfair to say that the FCC special staff did some smart bargaining with the Bell and certainly chiseled a bigger and earlier reduction from the Bell than it would have made voluntarily.

For this relief, which may easily run into eight figures, the telephone subscriber (as distinguished from the telephone security owner) is beholden to the FCC special investigation. And so, judged solely by the monetary standard, it must be admitted that the investigation has been worth its keep.

But this, in the opinion of your correspondent, is a false standard for judging the value of the investigation. This much could perhaps have been accomplished without spending a dollar of Federal money, by the personal and persuasive efforts of President Roosevelt, aided and abetted by a well-trained chorus of congressional threats.

THE NEW YEAR, 1937

MOST PEOPLE find looking forward to the New Year 1937 a much pleasanter task than they faced a year ago when peering into the future. At that time we confronted a red-hot political campaign year with all its uncertainties and fears, and the disquieting breath of the Old Wolf Depression was still scorching our national neck, with millions out of work and on relief.

Our country has survived the presidential campaign, business now is materially better, jobs are more plentiful, and while the government relief forces are still operating, all will agree that we have advanced a big step toward recovery. Conditions in the United States warrant a most hopeful attitude in looking ahead, and so TELEPHONY can with good reason wish its friends of the telephone industry "A Happy New Year!"

The telephone business can look forward to a successful year in 1937, as reports from all over the field show that the replacement of stations lost during the slump steadily increased through 1936, and today shows no sign of waning. It is apparent that the public still regard telephone service as one of the essentials of normal American living, and it is also plain that the company sincerely striving to do a good job in supplying that service has a definite, permanent place in American business life.

The New Year is certain to bring increasing activity in the telephone field, as the buying of equipment and supplies—delayed during the years of depression—is resumed to compensate for the period of waiting.

As an evidence that citizens of the United States should enter the New Year with confidence, TELEPHONY readers are invited to read the following excerpts from a letter received by the editor from a prominent European telephone engineer:

"You Americans are very lucky to have the Atlantic ocean between you and Europe. Things are most unsettled here. We have a civil war in Spain, as you know, and at any time this might light a spark which would set the whole of Europe in a blaze. Everybody is arming for defense purposes, and 'defense' today becomes 'offense' tomorrow. We have at present a decrease in unemployment which gives an appearance of a return to prosperity, but if the armament program were to be suddenly stopped the prosperity (or much of it) would stop, too. Our prosperity is artificial, rather than real.

"The next European war will be a most frightful affair. Civilian populations, as well as armies and navies, will be involved. We had a small taste of this in the last war, and it may well be that the next occasion, if on the same scale, will wipe out of existence European civilization. I don't suppose that you in America are entirely free of trouble, but at all events your troubles are internal ones and, therefore, curable if only the nation has the will to cure them."

Viewed from abroad, the United States is the best place in the world in which to live. Why shouldn't we all say to each other: "Happy New Year!"

IT IS BIGGER and more lastingly important game that the investigating staff is after, and during 1936 it is the consensus that it made a fair beginning. Its methods were perhaps at times unfair, but, without arguing too much on how the job was done or whether it was done thoroughly, the FCC special investigation did at least touch nearly all the bases.

It opened up for discussion such intimate telephone matters as Bell intercorporate relations, its security and financing policies; its employe, public relations, and operating policies. For all these developments—for the mere shedding of light, however imperfectly—the unbiased observer must close the year 1936 with the special investigation definitely on the credit side of the ledger.

In this connection, it should be noted that the special investigation seems to be improving with age. The staff research and testimony is becoming less spectacular—more realistic. In short, the investigation seems to be getting its bearings at last; and when it finally does, the record that it compiles will probably prove of more value to the telephone industry than to anyone else.

Needless to say, the Bell management is watching this record with interest. Nobody is suggesting that the Bell doesn't know how to run its own business, but many a Bell official has been given a fresh viewpoint by the testimony that is being produced here in Washington. Independent management, also, is in a position to profit by example, and probably will.

TURNING from the special staff to the FCC itself, the year 1936 has been a critical one, but it has come through in unexpectedly fine shape towards the last half of the year. When one looks back and considers the conflict and confusion that has dogged the path of the baby commission, it seems incredible that it has survived the year without a single resignation in its membership.

There were the silly bribe rumors, handled ineptly by the commission itself. There was the inexcusable part played by the FCC in the seizure of telegrams in connection with the Black lobby investigation, so soundly rebuked by the District of Columbia Court of Appeals.

There were the slips and errors in connection with the handling of the special telephone investigation during its early stages of public hearing, and in the handling of certain controversial radio broadcast incidents. And finally, there was the continuous and persistent conflict within the commission itself which time and again broke into the open, giving the impression that this commission could not keep its own house in order.

Then, with all the explosive possibilities of a red-hot campaign year staring it in the face, the FCC set-

tled down, shut its mouth more or less, and tried to mind its business. And it has come through. Internal conflict has not all been ironed out by any means. One or more resignations in the future would not be surprising. But this much must be conceded:

Whereas this time last year a congressional investigation of the commission seemed inevitable, at present the possibility of such an investigation is remote. The commission's prestige, while still relatively modest, has improved and is now improving.

Give credit wherever you feel it is due; the job of handing out personal laurels is much too ticklish for this correspondent. On the whole, however, the FCC should finish 1936 with a sigh of satisfaction. It was a trying year but it looks like smoother going ahead.

FROM the standpoint of regulation, the year 1936 witnessed a number of significant events in Washington. Most notably, perhaps, was the upholding of FCC accounting rules by the U. S. Supreme Court. Then there was the settlement of the coaxial cable case and important decisions by the FCC in a number of cases involving the jurisdiction status of alleged Bell-Independent telephone companies (such as the Rochester Telephone Corp.) which will probably have to go to the courts for final adjudication.

From the viewpoint of general Washington developments, the year 1936 touched the telephone industry but lightly. There was no special taxation and no other congressional legislation that involved the telephone industry particularly. The important social security program is now under way, but that was enacted prior to 1936.

There were some difficult problems about the Rural Electrification program but they seem to be clearing up without undue inconvenience to the industry. The lending and spending agencies of the Federal government (PWA and WPA) have given the telephone industry no substantial worry to date.

The smashing re-election of President Roosevelt and an overwhelmingly pro-New Deal Congress may affect the industry vitally, but that remains to be seen in the future. By and large, the telephone industry with an eye to increasing subscriber stations and gross revenues can afford to close the year 1936 with satisfaction. It can well be thankful; there are other utility industries that can hardly say as much.

The Operators' Corner

By MRS. MAYME WORKMAN

Traffic Supervisor, The Illinois Telephone Association, Springfield, Ill.

NEW THINGS are enticing. We approach them with interest and anticipation. May the New Year bring you much happiness. Series 270

SOMETHING new! Something different! These words always arouse our interest and so at this season we approach the New Year, 1937, with keep anticipation. What will it be like? What does it hold in store for us? Will it bring happiness? These and many other thoughts flit through our minds.

The old year which passed so rapidly will soon be history. As we view it in retrospect we will probably find that it brought the usual variety of joys and sorrows, pleasures and cares, heartaches and happiness.

Perhaps we planned many things with the advent of the past year, plans which never materialized. On the other hand, many good things came our way, things which were never anticipated or even dreamed of. That seems to be the way of life.

Death also took his usual toll — perhaps a relative or a friend who was very near and dear to us. But we also added new and pleasant links to our chain of friendship which proved to be a compensation and consolation for our bitter loss.

Good fortune smiled on some and they took a step higher up the ladder of success. Others are still plodding on, ever hopeful that as each new day dawns it will bring good fortune their way.

Whatever the old year brought forth, good or evil, it is now about to become a bit of history. As we shed our summer raiment in the fall in anticipation of the cool days ahead, so should we also shed the happenings of the past year and prepare for the New Year which is now before us. Time marches on and we must ever go forward. The mistakes of the past cannot be corrected but they can be a guiding star in mapping out our future course.

One of the writer's most pleasant recollections of the past year are the contacts and associations with coworkers and friends far and near. The personal visits, telephone calls, friendly letters and group meetings where we gathered to promote good fellowship and to cultivate the art of rendering the highest quality of telephone service. All these are happy memories.

As we approach another New Year, may it bring for all an abundance of happiness, success, peace and contentment; many friendly contacts and pleasant reunions; an opportunity to improve our skill and add to our fund of knowledge so that we may continue to render pleasingly and efficiently a service which has become indispensable to the nation.

May no plea go unheeded. "I want a doctor," "I want the fire department," "I want the hospital," to a world of "I want's," may each request be granted pleasantly, accurately and with the greatest possible speed.

Why? Because as telephone operators we are filling a most responsible position in the machinery of life. The operator's keen sight, alert mind, nimble fingers and quick action often result in saving of life and property. She has her fingertips on the very pulse of life and fills the communication need of a vast nation.

Therefore, she must be courageous and faithful, loyal and dependable. A big order, but one that is filled daily by operators at the switchboards in the telephone exchanges throughout the nation.

Questions from Illinois Operators

1. When a call is placed to the operator, why can the operator locate a certain party all over town and it still be a station call?

2. Why should we hold customers on the line on long distance calls?

3. Is it necessary to write the name of the calling place in full on an "IN" ticket?

4. How do you make out your ticket if collect and called number is a pay station?

5. On a collect station-to-station call of 20-cent rate, charge is refused and call is "ag paid," what is the rate on ticket?"

For the answers to these traffic questions, please turn to page 32.

Power System Grounds And Telephone Lines

By J. W. WOPAT

Consulting Telephone Engineer, Fort Wayne, Ind.

DISCUSSION OF CERTAIN CONDITIONS of a power system as developed in tests made in Iowa to determine whether multi-grounding the neutral of a wye system interfered with paralleling telephone circuits, or if the interference was the same whether neutral was multi-grounded or uni-grounded. Address before plant division conference at annual convention of United States Independent Telephone Association

CERTAIN tests were made in Iowa during 1935 to determine whether multi-grounding the neutral of a wye system had any material interferring effect on parallel telephone circuits, or if the interferring effect was the same whether the neutral was multi-grounded or uni-grounded.

There was a hearing on the matter in August of 1936 before the Iowa Railroad Commission. The power experts used this Iowa test as a basis and testified that it made no difference whether the system was multi-grounded or uni-grounded. The Iowa Independent Telephone Association opposed the contention of the power company at the hearing, and the commission issued an order with which you are all no doubt familiar (TELEPHONY of August 29, 1936). So the order will not be discussed and my remarks will be confined to a discussion of some of the salient points as disclosed in the Iowa tests.

In table VI which appears on page 19 of the report of these tests, it will be noted that tests were made under three conditions of the power system:

1. Three-phase circuits fed by direct-connected generators
2. Three-phase circuits fed by delta-wye banks
3. Single-phase circuits

In the previous paper ("Inductive Interference," by Robert M. Wopat, TELEPHONY of December 5) it was shown that each of the foregoing power conditions had its own peculiar influence, so I shall not discuss that feature now. In table VI it is seen that, by averages of the several readings, the ratios of the residual KV.T product increased the interference on the parallel telephone circuit 48, 14 and 23 per cent respectively, when the neutral was multi-grounded.

Table VIII on page 21 of the Iowa report shows the summary of ratios of phase I.T. product for multi-grounded condition to corresponding values for uni-grounded condition.

Frequency	No. of Measurements	Ratio M/U Avg.	Min.	Max.
(a) Three-Phase Circuits Supplied by Direct-Connected Generators (Council Bluffs)				
60	14	1.23	.41	2.6
180	14	.74	.33	1.04
KV.T	14	1.48	.27	3.34
(b) Three-Phase Circuits Supplied by Delta-Wye Banks (Valley and Monticello)				
.60	6	2.53	.56	6.3
180	5	1.12	.92	1.43
KV.T	9	1.14	.65	1.74
(c) Single-Phase Circuits				
60	4	.99	.97	1.02
180	4	.93	.73	1.05
KV.T	5	1.23	.75	2.2

Table VI. Summary of Ratios of Residual Voltage for Multi-Grounded Condition to Residual Plus Neutral-to-Ground Voltage for Uni-Grounded Condition.

Ratios of Measured I. T. No. of Meas.	Avg.	Min.	Max.
(a) Three-Phase Circuits Supplied by Direct-Connected Generators (Council Bluffs)			
20	1.02	.50	1.78
(b) Three-Phase Circuits Supplied by Delta-Wye Banks (Valley and Monticello)			
11	1.08	.40	2.34
(c) Single-Phase Circuits			
7	1.08	.79	1.79

Table VIII. Summary of Ratios of Phase I.T Product for Multi-Grounded Condition to Corresponding Values for Uni-Grounded Condition.

No. of Meas.	Avg.	Min.	Max.
(a) Three-Phase Circuits Supplied by Direct-Connected Generators (Council Bluffs)			
16	1.22	.50	2.55
(b) Three-Phase Circuits Supplied by Delta-Wye Banks (Valley and Monticello)			
10	1.05	.56	1.63
(c) Single-Phase Circuits			
7	1.12	.76	2.1

Table X. Summary of Ratios of Phase-to-Ground Voltage T.I.F. for Multi-Grounded Condition to Corresponding Values for Uni-Grounded Condition.

This is the magnetic influence, whereas in table VI we saw the effect of the electrostatic. Here again, under the three power conditions, the increase was 2, 8 and 8 per cent, respectively.

Table X, on page 22 of the report, shows the summary of the ratios of the phase-to-ground voltage T.I.F. (Telephone Influence Factor) for multi-grounded condition to corresponding values for uni-grounded condition. From this table it will be noted that the effect of multi-grounding of the neutral increased the influence 22, 5 and 12 per cent, respectively, for the various power conditions of the system.

It will be observed also, that the maximum increase of the various influences in some instances rose to a substantial value, some 600 per cent. Now then, how can anyone say honestly that it makes no difference whether the system is uni-grounded or multi-grounded; that the interference is the same, when we see here that the average in every instance shows a very substantial increase, and the maximum rises to 600 per cent.

Table XIII on page 29 of the report gives the summary of the receiver

noises observed on metallic and grounded return telephone circuits, and noise-to-ground in special test exposures under multi-grounded and uni-grounded conditions. I want to briefly make an explanation of the power conditions; the report explains how the power system was changed. Of course, we are interested only in the normal operating condition of the power system.

Condition 5 is the normal operating condition of the power system, namely the neutral of the generator was grounded through a 3-ohm resistor; 5-A is the same as 5, except the neutral of the generator had a dead ground; in condition 5-B the neutral of the generator was isolated. These three conditions and their effects were explained in the previous paper ("Inductive Interference" by Robert M. Wopat, TELEPHONY of December 5). We are not interested in the other power conditions, so I will not attempt to describe all of them.

We are largely interested in the single-phase exposure, but there is very little in this report on a single-phase exposure. This type of exposure, I want to point out, is under test locations J and P. You will notice under power condition 5, test location J, in the last column (Table XIII) the noise increased from 8,800 noise units to the 12,600 noise units in the circuit going east; in the circuit going north it increased from 3,200 to 4,000 noise units.

In test location P, under power condition 5, the noise decreased from 3,200 to 2,000 noise units. This decrease was due largely to the fact that this test exposure was at the very end of the power line. This factor has a very material effect on interference, namely, whether the exposure is at the near end or the far end of the power system.

There are other interesting data on this table; that is, the comparison of the noise under the three conditions —5, 5-A and 5-B. Under 5-A when the neutral of the generator was dead-grounded, the noise on the telephone lines was out of all proportion; under 5-B when the neutral was isolated, there was a material reduction of the noise as compared to the condition when the system had a three-ohm residual in the neutral.

Another interesting fact, as disclosed in this test, table XIII, is the comparison of the noises under test location G and test location K under corresponding power conditions. It will be noted from this table that on test location G, when the neutral was multi-grounded, the noise increased materially—somewhere in the order of two to one—whereas, on test location K the reverse is true.

This is interesting in that these two locations are approximately 60 miles apart. The explanation for it is that when the circuit is multi-grounded at test location K, feeder 252, feeder 92 in the opposite direction went into resonance to the 900-cycle frequency.

Table XXVI gives the summary of noise measured at test location J, single-phase exposure, extension to feeder 92, and shows the noise units in different types of telephones. These are designated as Western Electric, M, K and A.

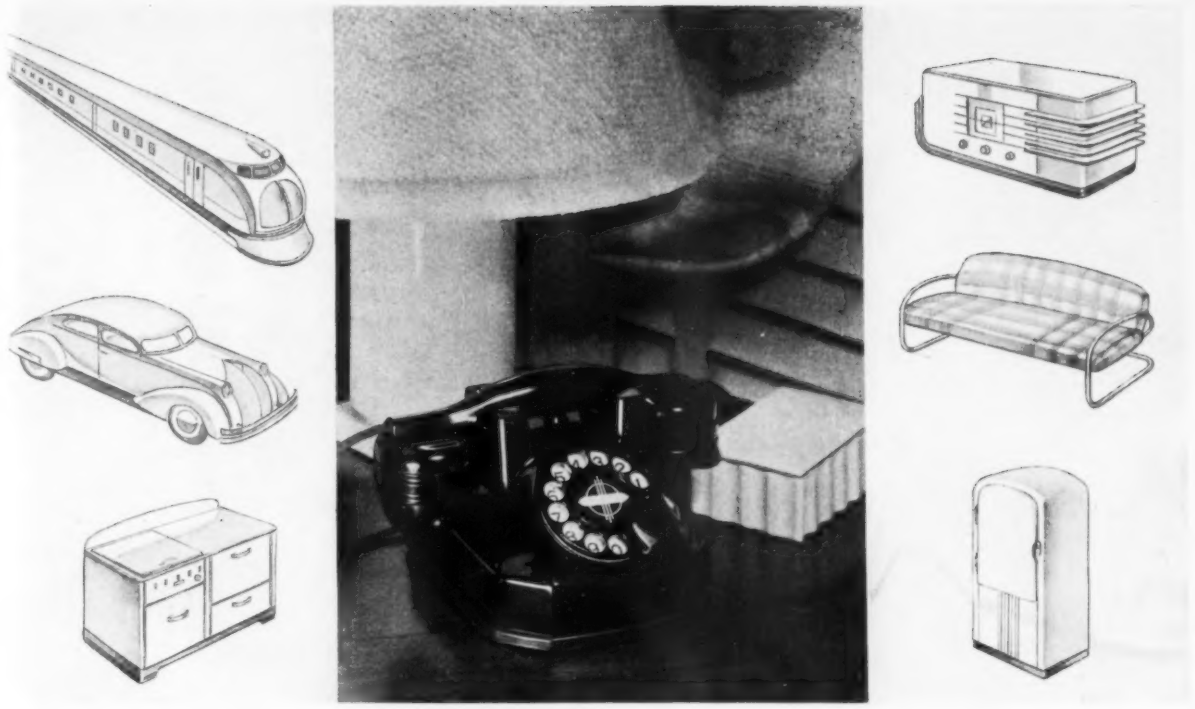
Notice the wide range of noises with different telephones. However, under the multi-grounded condition the noise is materially increased in all cases over the uni-grounded condition.

The explanation for the various differences between the instruments

(*Concluded on page 20*)

Test Location	Power Condition	Noise to Ground (Far End Grounded)		Metallic Circuit (Bridge Ringer)		Receiver Noise Metallic Circuit (Grounded Ringer)		Gnd. Return Circuit (Terminal in Subset)	
Neutral Wire		M	U	M	U	M	U	M	U
C	1	800	1000	250	310	900	1250	(46,000)	(57,000)
E ϕ	4	100	140	200	200	250	280	(5,700)	(8,000)
G	5	1160	580	...	...	...	...	(56,000)	36,000
G	5A	6000	2800	...	...	...	...	(342,000)	(160,000)
G	5B	500	280	...	...	...	...	(28,500)	(16,000)
G	5	620	350	135	250	1175	1100	(35,300)	(20,000)
G	5A	3350	1600	...	700	...	2500	(190,000)	(91,000)
G	5B	280	160	80	70	860	280	(16,000)	(9,100)
H	5	350	160	63	32	470	250	25,000	11,000
H	5A	1600	900	265	125	2350	1100	112,000	50,000
H	7	266	220	...	...	...	...	.....	16,000
H	8	158	250	...	...	...	...	(9,000)	(14,300)
J (East) ϕ.	5	158	190	32	50	158	190	12,600	8,800
J (East) ϕ.	5A	562	280	112	70	700	310	50,000	22,400
J (North) 1ϕ	5	9	8	0+	0+	0+	28	4,000	3,200
J (North) 1ϕ	5A	36	18	89	50	100	50	17,800	7,850
K	5	190	390	63	70	700	950	(11,000)	(22,000)
K	5A	440	2200	440	280	1500	4700	(25,000)	(126,000)
K	6	280	390	63	...	745	...	(16,000)	(22,000)
K	6A	1400	1880	330	...	2800	...	(80,000)	(107,000)
L	5	200	500	...	...	...	...	(11,000)	(28,500)
L	5A	440	2900	...	...	...	...	(25,000)	(165,000)
M	5	175	580	...	580	...	900	(10,000)	(33,000)
M	5A	500	2800	...	2000	...	2800	(28,500)	(160,000)
M	5B	110	390	...	390	...	700	(6,300)	(22,000)
N	5	200	350	56	40	316	500	(11,400)	(20,000)
N	5A	630	2200	100	...	1000	...	(36,000)	(125,000)
O	5	112	140	89	140	150	160	(6,400)	(8,000)
O	5A	316	350	280	310	350	350	(18,000)	(20,000)
P 1ϕ	5	28	53	0+	0+	28	56	2,000	3,200
P 1ϕ	5A	70	89	0+	0+	79	100	4,500	5,000
Q	9	40	36	0+	0+	56	56	1,900	1,580
Q	10	30	34	0+	0+	57	45	2,300	1,320
Q	11	18	20	0+	0+	25	28	900	1,100
Q	12	30	19	0+	0+	40	25	1,350	1,100
R	9	13	18	0+	0+	23	28	500	620
R	10	16	13	0+	0+	35	23	660	600

Table XIII.—Summary of Receiver Noise Observed on Metallic and Ground Return Telephone Circuits and Noise-to-Ground in Special Test Exposures Under Multi-Grounded and Uni-Grounded Conditions (All Values in Noise Units).



YOUR SUBSTATION EQUIPMENT... is it ABREAST OF THE TIMES?

Would a General commanding a modern army equip his front line soldiers with muzzle-loading muskets? Or—to shift the scene a bit—is it good psychology to let old-style telephones represent the modern telephone service you are rendering the public?

Why not begin now to retire your old substations and replace them with handsome new "streamlined" Monophones? Remember, the telephone instrument is the only part of the telephone plant which the subscriber sees, and he is more than likely to judge the quality of service by the appearance and convenience of his substation set. Are you satisfied with your present representation?

Sooner or later you will have to modernize your subscriber equipment. Good sales strategy says—"Do it now!"—when people are in a buying mood and new service contracts and extensions can both be promoted with equal success. May we send you Monophone prices and full information?

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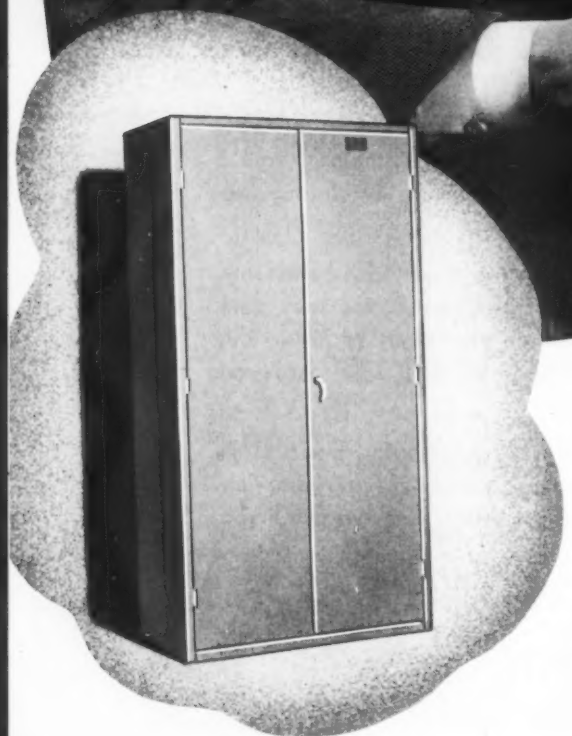

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(*Concluded from page 16*)

is due to the impedances designed in the telephone circuits. The ones referred to are those which show the far-end termination set in the circuit. The others are merely experimental data and were taken in connection with the harmonic studies.

Rural Electrification

No sane individual, I am sure, will argue against rural electrification; on the contrary, every one should be happy if it were possible to provide tremely light rural telephone loads and that it is necessary to construct and maintain these as economically as possible.

Shall the rights of the telephone company be subordinated to those of the power company? Can the power company appropriate to its own use the earth as a return circuit at the exclusion of all others?

To use the earth as a return circuit is to make use of a natural phenomenon which should be enjoyed by all. It seems to me that when one makes use of a natural phenomenon so as to make its use to others impossible, such use makes the party guilty of creating a nuisance.

I will say this: that with grounded telephone lines exposed to grounded power lines with voltage suitable for rural transmission, with highway separation and more than a mile parallel, the telephone line must be made metallic. Power men say that grounded or isolated systems, from the standpoint of inductive interference, are practically the same and that on exposures of a mile or more telephone circuits must be metallized.

This is not true and, no doubt, each of you knows of exposures of grounded telephone lines paralleling power lines where the exposures are greater than one mile and the grounded telephone lines are giving good service. Refer to the previous paper—"Inductive Interference" by Robert M. Wopat, TELEPHONY of December 5—which gives the results of noise measurements on grounded telephone lines, some having an exposure to power lines of 12 miles. The noise level is very low because the power system was either isolated or neutral uni-grounded.

I assume you would like to know what to do when a line is proposed and you are involved in a parallel. First, assume that there will be inductive interference, whether your lines are grounded or metallic. If you are dealing with a commercial power company, state your case to its representatives and advise them that you will expect them to reimburse you for the expense of eliminating the interference.

If you are dealing with a cooperative, it is very essential that an estimate of the cost be prepared and filed with the project engineer and be included as a part of the cost. If this is not done and a loan is made to the cooperative without a provision for contingency, such as inductive interference, the cooperative has no money to pay for the cost of eliminating interference. I understand that it is the policy of the REA to include in the loans to the cooperatives monies to cover this contingency.

But this all must be made known *before the project is submitted for approval*. In other words, if you wait until the line is energized and then complain, you may be left sitting on the lot after the parade has gone down the street.

We must insist that proper construction specifications are followed; when dealing with lines carrying high voltages, the best specifications are none too good.

Power Condition	Telephone Circuit	Far-End Term.	Ground Return Telephone Circuits, Receiver Noise							
			West. Elec.				M	K	A	
			M	U	M	U	M	U	M	U
5	67 (North)	Set*	4,000	3,200	2,800	2,200	4,500	3,500	3,600	2,800
		0	1,120	900	500	500	1,100	900	700	620
		500	3,200	2,500	1,800	1,600	3,200	2,500	2,500	1,750
		2000	5,600	3,900	4,000	3,200	5,600	4,400	5,000	3,500
		Open	7,940	6,300	7,100	5,800	7,940	6,300	7,940	6,300
5	66 (East)	Set*	12,600	8,800	8,900	6,300	14,000	8,800	10,000	7,000
		0	17,800	12,400	8,900	7,800	18,000	14,000	12,600	9,900
		500	14,000	11,000	7,940	6,300	14,000	11,000	11,000	8,800
		2000	11,000	8,800	6,300	5,800	11,000	8,800	8,900	7,000
		Open	7,940	7,000	5,000	3,900	8,900	7,800	5,600	5,800
5A	67 (North)	Set*	17,800	7,850	12,600	5,800	20,000	8,800	15,800	7,000
		0	4,470	1,750	2,240	1,000	6,300	2,500	3,200	1,400
		500	15,800	6,300	8,900	3,900	17,800	7,800	11,200	5,000
		2000	25,000	11,000	17,800	7,850	25,000	11,000	22,400	8,800
		Open	31,600	15,800	31,600	15,800	31,600	15,800	31,600	15,800
5A	66 (East)	Set*	50,000	22,400	36,000	15,800	56,000	25,000	45,000	18,000
		0	70,800	28,000	31,600	17,800	79,000	40,000	45,000	22,000
		500	56,000	25,000	28,000	15,800	56,000	32,000	40,000	20,000
		2000	40,000	20,000	28,000	12,500	40,000	22,000	32,000	16,000
		Open	28,000	17,800	22,400	9,860	28,000	15,800	22,400	11,000

Table XXVI.—Summary of Noise Measured at Test Location J. Exposures to Single-Phase Extensions of Feeder 92, East of Underwood, Iowa.

the farmer with all the electric power he may require. Whether this is economically possible is beside the point. We all agree, I am sure, that we have no interest in the problem except where our property is placed in jeopardy from physical or inductive interference. This brings us to the type of construction that the power company or REA cooperatives adopt when building power lines on highways on which the telephone company has telephone circuits.

The power companies say that with the extremely light-load densities encountered in rural areas, it is absolutely necessary that supply lines be constructed and maintained as economically as possible. They say that a multi-grounded primary line is highly desirable because of its cost; to this, we agree. But what about the telephone company that has grounded lines on the same highway?

A multi-grounded neutral line is a grounded power line. I think we all agree that the grounded telephone circuits are also built because of ex-

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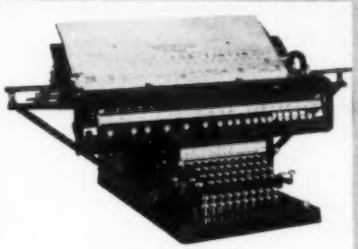

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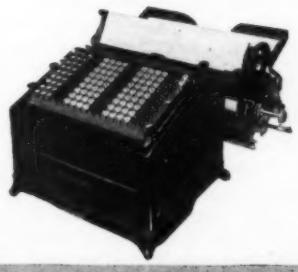

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FCC Bell Probe Moving Rapidly

AFTER RECEIVING REPORT and testimony concerning activities of Bell Telephone Securities Co. and purposes sought through its organization, FCC takes up prices of exchange equipment and handsets. Western Electric prices asserted to be much higher than those of Independent manufacturers on a comparable basis. Extra charge to subscribers for handsets declared by commission engineers to be unwarranted. Bell motion-picture sound recording monopoly denied

LAST WEEK the hearings in the FCC investigation of the American Telephone & Telegraph Co., were devoted to testimony concerning the Bell Telephone Securities Co. on Monday, December 14; to wire services to broadcasting companies on December 15; to A. T. & T. methods of comparing Western Electric prices with those of Independent manufacturers, on December 17; and its revenues from handsets on December 18.

This week hearings were held in New York City, commencing on December 21 with testimony on A. T. & T. activities in the motion picture industry. J. E. Otterson, former president of Electrical Research Products, Inc., was the first witness.

The primary purpose of A. T. & T.'s six-year drive to secure nation-wide distribution of its stock was to improve the company's financial structure so that capial stock rather than mortgage debt could be issued to finance capital improvements, President Walter S. Gifford declared at the hearing on December 14. He insisted that customer ownership of the company and its attendant benefits was a secondary motive of the campaign.

Bell Securities Company Intended to Increase Stockholders

This testimony followed introduction of a comprehensive report, submitted by Sterling M. Baker, FCC accountant, dealing with the formation and activities of Bell Telephone Securities Co. The purpose of the securities company, it was brought out, was to effect wider distribution of A. T. & T. stock.

The Baker report said the legal department of the A. T. & T. Co. expressed doubt as to A. T. & T.'s legal right to ownership of the securities company's capital stock. It was stated that failure of A. T. & T. to reimburse the associated Bell companies for all the actual expenses incurred by them in connection with the securities company's activities, resulted in the inclusion by the associated companies of a part of these expenses in the course of rendering telephone service.

The real purpose of the securities company, Mr. Baker testified, was to increase the number of A. T. & T. stockholders, and the public relations aspect of such a program was a vital part of the activities of the company.

In conjunction with the publicity work, various plans were adopted by the securities company to facilitate the purchase of capital stock of A. T. & T. at current market prices, principally by investors of small or modest means, either for cash or on the installment payment plan. The major part of the shares required for delivery to such investors, when they had completed the payments on their purchases, was obtained in the open market.

The report submitted by Mr. Baker stated that the A. T. & T. was not legally authorized by its charter or by statute to engage in such activities as were carried on by the securities company. The A. T. & T., however, owned the entire $1,000,000 of capital stock of the securities company despite an expression by a member of the legal department of A. T. & T. as to the legality of the ownership, the report said.

A. T. & T. Stock Purchased by Securities Company

A considerable part of all the purchases of A. T. & T. stock upon the New York and Boston exchanges between 1923 and 1927 was for account of the securities company. In one year, it was stated, nearly 40 per cent of the shares traded in on those exchanges were purchased by the securities company.

Enlistment of Kidder, Peabody & Co., in the summer of 1920 to conduct a campaign for wider distribution of A. T. & T. stock was detailed in the report submitted by Mr. Baker. The campaign consisted of circulars to all parts of the country regarding the investment value of A. T. & T. stock and offering easy payment plans for its purchase.

The agreement with the firm provided that it would receive remuneration equal to 1 per cent of the par value of additional capital stock sold by A. T. & T., exclusive of sales to employes, and expenses incurred for publicity work.

Kidder, Peabody & Co. was active in the campaign until the end of 1922. During that period the firm was paid a total of $3,559,385 as remuneration and expenses. In the meantime, in September, 1921, the Bell Telephone Securities Co. was formed to accomplish virtually the same purpose for which Kidder, Peabody & Co. was employed. The securities company's active work ceased at the end of 1927 and it was dissolved in September of this year so as to avoid the provision of the 1936 Revenue Act affecting liquidation of corporations.

The number of stockholders of A. T. & T. increased from 185,856 at the end of 1921 to 680,454 at the end of 1933, most of which was effected through activities of the securities company, the report submitted by Mr. Baker stated. During the period of its operations, the securities company redistributed over 2,000,000 shares of A. T. & T. capital stock.

Income from Stock the Important Thing

President Gifford of the A. T. & T. and C. S. Van Cise, assistant treasurer of the A. T. & T., were other witnesses at this hearing, answering questions relative to financial policies and matters of the Bell.

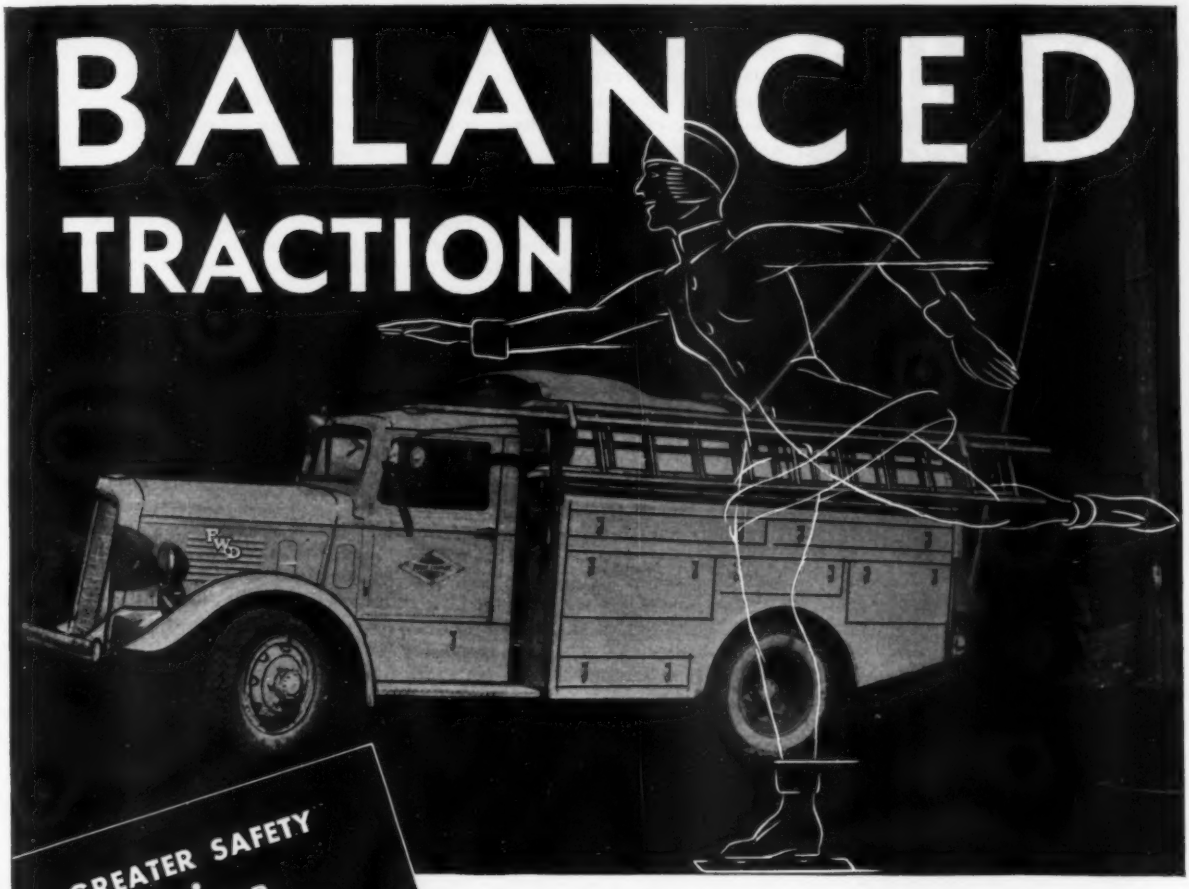
Questioned by Chairman Paul A. Walker of the telephone division of the FCC, in charge of the investigation, Mr. Gifford expressed his opinion that it would be more advantageous to the company to have the return on securities stabilized rather than the price.

"It is the income on the security which I think is the important thing from the standpoint of the credit of the company and the good will of its stockholders and successful management," he said. "The stabilization of the market price I think is not of any great importance."

Mr. Van Cise, in his testimony, brought out that a comparison of A. T. & T. stock prices with those of other standard industrials and rails between 1923 and 1927 showed no marked trend of the activities of the Bell Telephone Securities Co. as enhancing the value of the A. T. & T. stock.

On December 15 a comprehensive report of Bell System policies and practices in radio broadcasting was intro-

BALANCED TRACTION



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duced in testimony by Dr. N. R. Danielian, FCC accountant. He declared the Bell exercises almost complete control of radio program transmission and has indulged in discriminatory practices in the leasing of wire facilities to radio stations and chains.

Bell Policies and Practices in Radio Broadcasting

The report states that the Bell System has practiced discrimination in the exercise of its monopoly position and in the application of its policies in giving wire services to broadcasting stations and with respect to inter-connections with other wire-using companies. Although A. T. & T. licenses were required from broadcasting stations before they could obtain wires from the Bell associated companies, it is charged that in many cases exceptions were made, often with a view to public relations.

Similarly, although refusal to interconnect Bell wires with those of others is a long standing policy of the Bell System and is now incorporated in tariffs filed with the FCC, the report alleges that there have been many exceptions which permitted radio stations to avail themselves of the less expensive telegraph company circuits, whereas others have been denied the same privilege.

No attempt is made in the report to evaluate the patent position of the A. T. & T. in the radio field, nor to determine the reasonableness of the rates charged broadcasters for program transmission and attendant services.

Gross revenues of the long lines department of the A. T. & T. in 1935 from leasing on wire channels totaled $4,529,162, and net revenue $3,576,356, it was stated. In addition to these amounts, the Bell associated companies also receive a considerable amount of revenue from leasing wire facilities directly to broadcasting stations for both local and long distance service.

Because the associated companies do not segregate in their accounts these revenues, the report says, it has not been possible to obtain these figures except for 1935. Last year, it was estimated that the combined revenues of the Bell associated companies and long lines department of the A. T. & T., from this source, including public address system services, were over $5,500,000.

Although the revenue derived by the Bell System from leasing wire facilities is not very large in comparison with the total revenues of the system, yet the services for which the revenue is a payment are indispensable to the radio stations, it was stated.

Western Electric and Independent Manufacturers' Prices

The hearing was resumed on December 17 following a recess taken on December 15. On that day Cyrus G. Hill, engineer of the telephone division of the FCC, discussed A. T. & T. methods of comparing Western Electric telephone equipment prices with those of Independent manufacturers. Mr. Hill was examined by Holmes Baldridge, FCC attorney conducting the engineering phases of the investigation.

A protest was again entered in the record by T. Brooks Price, A. T. & T. counsel, against the practice of not permitting the company to cross-examine commission witnesses. It asked the right to recall and cross-examine each commission witness and to present evidence by its own witnesses and documentary exhibits in opposition to the commission's witnesses.

Price comparison studies which have been used by the A. T. & T. before most of the state regulatory commissions to demonstrate effectively the reasonableness of purchases by Bell operating companies from Western Electric Co. were termed "unfair" because of the dominance of the Western Electric in the telephone manufacturing field.

Mr. Hill submitted a comprehensive report detailing the part played by the Western Electric in the equipment manufacturing field and offering sharp criticism of the relative prices of Western Electric and Independent manufacturers' equipment.

Each year since 1924, the A. T. & T. has had studies prepared comparing the selling prices of the Western Electric for telephone apparatus, equipment and materials with the selling prices of comparable items manufactured by Independent suppliers.

These studies are used to demonstrate the reasonableness of purchases made under provisions of the standard supply contract between the Bell System companies and the Western Electric. They have been used by all Bell operating companies in state rate cases in attempts to justify reproduction cost estimates.

Advantages of Western Electric in Setting Prices

The studies, however, according to the FCC report, do not demonstrate the reasonableness of Bell company purchases from the Western Electric because the effect of sales volume, assured markets, sales risk and sales expense are ignored.

About 92 per cent of the total telephone sales of apparatus, equipment and materials to the telephone industry in the United States is made by the Western Electric, it is stated. The company "has an assured market, a known volume and an absence of sales and credit risks." The Independent suppliers enjoy none of the advantages.

The price studies were further criticized "because the items compared do not constitute a representative portion

of telephone plant. More than 50 per cent of the items compared, it was stated, consists of station apparatus, which constitutes less than 6 per cent of the reported Bell System investment in physical plant.

Furthermore, the prices used are not comparable, it was said, because they fail to compare prices on complete assemblies. All comparisons are made upon individual piece parts. The great majority of telephone apparatus, equipment and materials is sold in complete assemblies rather than by individual piece parts.

Independent Manufacturers' Prices and Western Electric's

The commission's engineer asserted the Bell associated companies paid the Western Electric from 50 to 550 per cent more for central office equipment for small exchanges than it would have cost if purchased from Independent manufacturers.

"A large part of the $4,250,000,000 investment in telephone property, and a portion of the $651,000,000 operating expenses of the Bell System are represented by the purchase prices of telephone apparatus, equipment and material," the report said.

"Investment in telephone plant and equipment as carried on the books of Bell System companies on December 31, 1935, amounted to approximately $4,250,000,000," the report stated.

"Upon this $4,250,000,000 base is predicated about one-half of the cost of telephone service, and correspondingly about one-half of the justification potentially claimable for existing subscribers rates."

The Bell System had operating revenues totaling $934,000,000 in 1935. Operating expenses, including taxes, totaled $651,000,000, leaving net operating revenue of $283,000,000 for a net return of 6.6 per cent.

Prices paid for equipment represent a large portion of the cost of telephone service and therefore directly affect rates, the report said. Bell System operating companies are required, it declared, to purchase virtually all of their equipment from the Western Electric at whatever price it chooses to charge.

The commission witness introduced a study of 24 Independent central office companies, compared with Bell System's offices, in support of the charge that prices of the Independent suppliers are lower than prices of the Western Electric by an average of 19 per cent for complete assemblies.

Open Competition Among Manufacturers for Bell Business

"The price comparisons," the report concluded, "indicate that if the conditions of open competition were instituted in the telephone field, the Independent manufacturers would obtain at least a fair share of the total sales of

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"Telephony's" Engineering Data

By B. C. BURDEN

Index, Pole Line Construction.
Dec. 26, 1936.
No. 15-B, Page 4.

In addition to the harness leather safety strap, there is a fabric strap which has been adopted by many of the leading utility companies. This strap, known as Klein-Kord, is a rubberized fabric which is strong and flexible. It is declared that the fabric strap has no appreciable permanent stretch in use and has great tensile strength with a full factor of safety.

Accidents Due to Carelessness

Many accidents occur, due to a lineman throwing his safety strap around the pole and apparently snapping through the Dee ring. Then leaning back, he finds that the safety snap has not completely engaged the Dee ring, with the result that the safety strap swings free and the lineman falls to the ground with more or less serious consequences.

After arriving at the level at which it is desired to work on a pole, one leg should be thrown around the pole for balance while the safety strap is unsnapped, the free end pulled around the pole and carefully snapped in the Dee ring.

The position that one should assume depends greatly upon the work that is being done. In general, it is desirable to place one foot slightly above the other as a matter of balance and so that the lower foot usually bears most of the weight. The position on the pole can be changed from time to time in order to relieve the strain from falling entirely on one foot. The illustrations in last week's issue show the various positions and the method of handling oneself on a pole.

In pole-climbing work it is important that the lineman's feet be kept in good condition. Most of the time while working the lineman is on his feet and, when climbing and standing on poles, his weight comes mainly on the arches. For this reason proper shoes are the safest preventive of foot trouble, as the shoes are built to hold the arches in their natural three-point, weight-bearing position.

When on a pole and supported by climbers, the entire weight of the body is placed on a supporting surface about one-inch wide under the shoe at the instep, just where the foot is not supposed to carry much weight. If a heavy-soled shoe is worn it helps to distribute the weight of the body over the entire surface of the foot. Hence it is advantageous when climbing and working on poles to wear a pair of heavy-soled shoes or heavy-soled hi-cuts, as a preventive of injuries to the foot.

"Telephony's" Engineering Data

By B. C. BURDEN

Index, General.
Dec. 26, 1936.
No. 39-A, Page 1.

Static Electricity

The exact nature of electricity remains unknown, although scientists have for years made intensive studies of its phenomena. It is usually defined as an invisible agent through which certain effects are produced. The ancients believed electricity was an invisible fluid which could be made to flow through metallic wires in a manner similar to that of water through pipes. Modern scientists, however, have proved that electrical current flow in conductors is due to the movement of billions of tiny, negative electrons.

It is not necessary to know the exact nature of electricity, however, in order to understand its action under

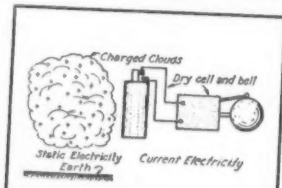


Fig. 1. Pictorial Representation of Static and Current Electricity.

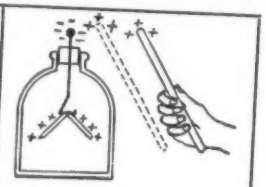


Fig. 2. Detection of Static Charges by Use of Electroscope.

varied conditions and to learn how to control and utilize it in order to produce certain desired results.

The two basic kinds of electricity are known as static and current electricity. The former is electricity at rest, examples of which are lightning, charges produced in one's body by shuffling the feet on thick rugs, charges on condenser plates, etc.

Current electricity is electricity moving in a stream, a good example of which is the electricity which flows through wires into our homes for light and power purposes. This, moreover, is the most useful type of electricity and the one with which we should become thoroughly familiar. Pictorial illustrations of static and current electricity are shown in Fig. 1.

When certain non-metallic objects are rubbed together, a charge of static electricity is created on one or both of the objects, one becoming charged with positive and the other with negative electricity. If we rub a glass rod

"Telephony's" Engineering Data

By B. C. BURDEN

Index, General.
Dec. 26, 1936.
No. 39-A, Page 2.

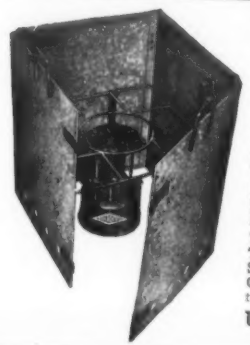
with a silk cloth, for instance, the glass rod will become positively charged and the cloth negatively charged. The terms positive and negative are arbitrary designations of different electrical effects and are used in much the same way as we refer to one direction as being east and the opposite direction as being west, to differentiate between the two.

The Electroscope

A device used to indicate the presence of static charges is the electroscope. This instrument consists of a narrow strip of gold leaf suspended on the end of a wire in a corked bottle, as shown in Fig. 2. The operation of this device is based on the fact that static charges of the same polarity tend to repel each other, while static charges of unlike polarity tend to attract each other.

When a charged body is brought near the metal knob of the electroscope, a charge is induced on the metal knob which causes an equal and opposite charge to be set up at the opposite end of the rod. Inasmuch as both sides of the gold foil are at the same polarity, they tend to fly apart, due to the repelling action of the like static charges. The presence of static charges is thus detected by the amount of movement of the foil.

Gold foil is generally used because of its extreme lightness, coupled with the fact that it is a good conductor. A thin sheet of tissue paper coated with aluminum paint will work quite well in an experimental setup. Electroscopes have little practical use outside of a laboratory.



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telephone apparatus, equipment and material in the United States."

It was pointed out that the greater volume manufactured by Independents under such conditions would permit of reduced prices, much below those which have been charged. Even under existing conditions, the report declared, the Independent manufacturers have produced equipment for the smaller exchange business open to them, of superior quality and operating features. The Bell associated companies, if they had been free to purchase from Independent manufacturers at the prices charged, and also purchase from the Western Electric, would have effected substantial savings.

No Necessity for Extra Handset Charge

Revenues in excess of $53,000,000 have been collected by the Bell System by means of the added monthly charge for use of the handset telephone, it was charged by Charles Lynn Terrel, engineer on commission's investigation staff, at the hearing on December 18.

The net profit on these revenues has been $24,000,000, it was stated, representing a 45 per cent profit of the gross revenue and an annual return of 25 per cent on the investment.

The report states that the large net profit thus far accummulated was sufficient to defray all alleged future added expenses of handsets until 1950, with a remaining profit of more than $11,500,000, even assuming that all monthly excess charges for use of the instrument were completely eliminated by January 1, 1937.

Of greater importance, according to the testimony submitted, was the fact that the A. T. & T. developed and introduced the handset telephone as a telephone transmission improvement of such magnitude that additional savings in wire construction costs of about $85,400,000 were made available to the Bell System because of the widespread use of the new instrument.

It was further alleged that these savings had not been fully revealed by the Bell System in its previous defense of the added charge before state regulatory commissions.

Introduction of the handset telephone into the Bell System, the report concluded, constituted ample cause for a reduction in telephone rates, rather than for the increase which had been obtained by means of the excess charge.

The report, FCC officials said, was based on data furnished by the A. T. & T. and its subsidiaries, or upon studies "taken from the company's file in which it had computed the profit for its own purpose."

Cyrus G. Hill, commission engineer, testified that 20 years before the handset was introduced in 1927 it had been developed to an efficiency greater than that of old style desk telephone. He claimed the 1907 handset was the equal of the 1925 desk telephone. It was not put on the market, he said, because of the A. T. & T.'s policy of "prolonging the life of the existing equipment" to avoid the expense of replacing it.

Design Fault and Changes in Handsets

A design fault in the original handset apparently was the cause of added maintenance, Mr. Terrel testified. It was not corrected for more than a year, although criticism and complaint were received from abroad and from some Bell engineers. A large part of an added maintenance cost of $8,000,000 of the handset between 1927 and 1936 was due to this design fault, the witness contended.

Nine successive changes in the design of the transmitter of the handset were detailed in the report as having been made after the instrument's introduction in 1927. A new "combined" handset instrument is now in process of manufacture. Its first cost and installation expenses are considerably less than those of the present type handset. A saving in installation costs is estimated at $1.40 for each of the new combined sets.

J. E. Otterson, former president of Electrical Research Products, Inc., denied on December 21 that ERPI or the Western Electric Co., had attempted at any time to keep other concerns out of the motion picture sound-recording and reproducing field.

He admitted, however, at the hearing, which was held in New York City, that ERPI controlled 90 per cent of this business from 1927 to 1935. During his tenure of office the company supplied equipment for most of the moving picture producers and a large number of moving picture theaters, but he insisted the company had no thought of exclusive control of the recording industry.

Contract clauses which require licenses to use ERPI products exclusively were, he said, to maintain a high standard of quality in equipment performance and to safeguard the reputation of the Western Electric Co., ERPI's parent concern.

Bell in Sound Recording and Reproducing Field

The witness said he recognized the importance of sound recording in 1927 and sent a memorandum to Edgar S. Bloom, president of the Western Electric, suggesting that this would prove a profitable field. At that time Radio-Keith-Orpheum was virtually the only ERPI competitor, although it was concerned with disc recording which since almost has been abandoned.

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the objects, one becoming charged with positive and the other with negative electricity. If we rub a glass rod

a pair of heavy-soled shoes or heavy-soled hi-cuts, as a preventive of injuries to the foot.

The Manufacturers' Department

New Stromberg-Carlson Ohio Representative

Walter E. Carlson has been appointed representative for the Stromberg-Carlson Telephone Mfg. Co. to cover southern Ohio and adjacent territory. Mr. Carlson takes over the territory vacated by the recent death of James E. Finley, long-time representative for Stromberg-Carlson in that territory.

It was in 1914 that Mr. Carlson had his first introduction to the telephone business when he started work for the Tri-State Telephone & Telegraph Co. at St. Paul, Minn. In 1916 he went with the Michigan State (Bell) Telephone Co. at Detroit. While he was still associated with that company the United States entered the World War, and Mr. Carlson joined his country's forces. After his discharge in 1919 he was actively associated in the work of unifying the automatic and manual telephone systems of St. Paul, Minn.

When this work was completed Mr. Carlson went to the installation department of the Automatic Electric Co. of Chicago. In 1924 he started work for the Stromberg-Carlson Telephone Mfg. Co. but left soon to go with the Rolla Telephone Co. at Rolla, Mo. Between 1929 and 1933 he acted as district manager for the United Telephone Co.

WALTER E. CARLSON, Ohio Representative of Stromberg-Carlson, Has Had More Than 20 Years' Experience in Telephone Work of Various Nature.

In 1934 Mr. Carlson became construction engineer for the United States Forest Service, building telephone lines in the state of Missouri. He served in this capacity until joining the Stromberg-Carlson sales organization this month.

▼ ▼

Kellogg Catalog for Magneto Exchanges

The Kellogg Switchboard & Supply Co., of Chicago, has just issued a new catalog prepared expressly for owners and operators of magneto exchanges, designated as catalog No. 92. Its 76 pages, 8¼ by 10½ ins., profuse with illustrations, cover all the necessary equipment, apparatus and supplies required in the operation and upkeep of a magneto telephone exchange.

This includes not only the well known and up-to-date Kellogg line of magneto telephone instruments, tools and parts, magneto switchboards of various types and sizes, power apparatus, test sets, tools, etc., but also pole-line hardware, torches and soldering irons, anchors, batteries, bells and buzzers, telephone booths, operators' chairs, telephone wire and cable and telephone poles.

Copies of this new catalog may be obtained from the Kellogg company upon application by those interested.

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Output — 80 volts, 19 cycles, 15 watts.
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112 South 16th Street Philadelphia, Penna.

OBITUARIES

HERBERT BELLAMY, Knoxville, Iowa, vice-president and treasurer of the Bellamy Telephone Co. and a director and local manager of the Iowa Power & Light Co., died suddenly November 9 after a brief illness which was not thought to be serious. He was 54 years old.

Born in Knoxville June 20, 1882, Mr. Bellamy was educated in the Knoxville public schools and Cornell college. He was graduated in the classes of 1899 and 1906, respectively. After finishing school he went to work for the Knoxville Electric Co. which, together with the local telephone company, was founded by his father, James S. Bellamy. He later spent a year or two on a South Dakota homestead but went back to Knoxville where he and his brother, Earle, took over the active management of the electric and telephone business.

Mr. Bellamy was well known to Iowa telephone men who will regret his untimely death.

He was very interested and active in community and welfare work, serving in many civic capacities. At the time of his death he was director of the Knoxville Chamber of Commerce and trustee of the Methodist Episcopal Church.

He held membership in all branches of the Masonic order and the Independent Order of Odd Fellows. He also was a member of the Des Moines club, the Wakonda and Knoxville country clubs, and of the Huegenot Society of America.

He is survived by his wife and their two children, Richard, 10, and Eleanor, 8; his mother, Mrs. J. S. Bellamy, of Knoxville; two brothers, Paul E., of Rapid City, S. D., and Earle D., of Knoxville; and a sister, Mrs. Imogene Bellamy Moore, of Asheville, N. C.

▼

JOHN C. HARDY, 68 years old, former state senator and prominent St. Paul, Minn., telephone executive for almost a quarter century, died at his home there on November 22. He retired in 1933 as St. Paul manager for the Tri-State Telephone & Telegraph Co.

He was elected to the upper house of the state legislature in 1903 and served two terms. During his tenure of office he was appointed a colonel on the staff of Governor John A. Johnson, a position he held until 1915 under two succeeding executives, Adolph O. Eberhart and Winfield S. Hammond.

Mr. Hardy became associated with the Northwestern Bell Telephone Co. in 1908, serving as local manager of that company until merged with the Tri-State company, after which he continued as local manager of the new company until his retirement.

Surviving are his wife; a daughter, Mrs. Ethel H. Mordaunt, St. Paul, and two sons, John C. Hardy, Jr., St. Paul, and William J. Hardy, Minneapolis.

▼

FREDERICK B. BENNETT, 73 years old, who went to Greenfield, Ind., from Indianapolis a year ago as chief auditor for the Union Telephone Co. and associated companies of northern Indiana, died December 9. He was deputy city controller for Indianapolis during the administration of Mayor Charles A. Bookwalter before going to Greenfield to live.

Born in Maine, Mr. Bennett had lived several years in Attica, Ind., before going to Indianapolis. He was connected with the old Indianapolis Telephone Co. and the Indiana Bell Telephone Co. in addition to its predecessor, the Central Union Telephone Co.

Mr. Bennett was a member of the Presbyterian church and the Masonic order and was a certified public accountant.

Survivors are the widow, Mrs. Nora F. Bennett, and a son, Frederick B. Bennett, Jr., Attica.

▼

E. S. SCHOENAU, of Clayton, Mo., auditor for the eastern Missouri and Arkansas area of the Southwestern Bell Telephone Co., died very suddenly November 12. He had been suffering from a heart ailment for some time.

COMING CONVENTIONS

Minnesota Telephone Association, Hotel Lowry, St. Paul, January 19, 20, and 21.

Nebraska Telephone Association, Hotel Lincoln, Lincoln, February 9 and 10.

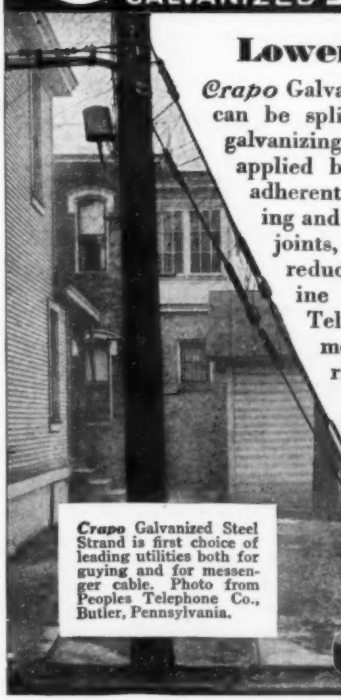
Texas Telephone Association, Baker Hotel, Dallas, March 16, 17, and 18.

Iowa Independent Telephone Association, Hotel Fort Des Moines, Des Moines, April 6, 7, and 8.

Indiana Telephone Association, Claypool Hotel, Indianapolis, May 11 and 12.

Crapo GALVANIZED PRODUCTS

INDIANA STEEL & WIRE CO. Crapo Galvanizing MUNCIE IND.



Crapo Galvanized Steel Strand is first choice of leading utilities both for guying and for messenger cable. Photo from Peoples Telephone Co., Butler, Pennsylvania.

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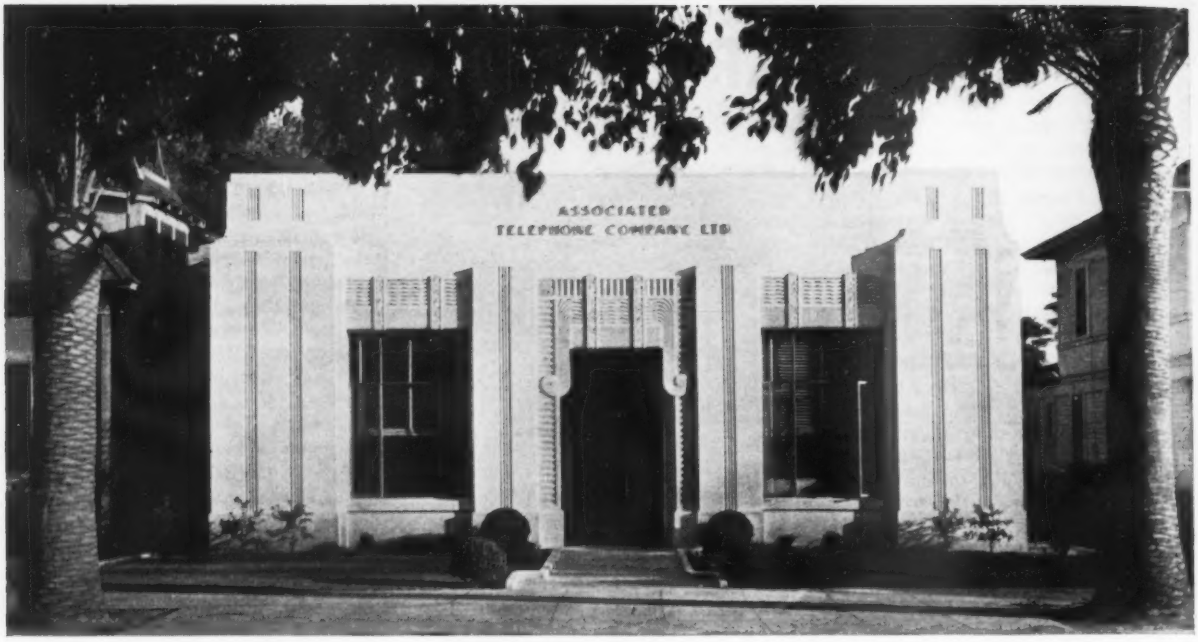


Two California Exchanges Converted to Dial Operation

By H. SWOBODA

General Plant Superintendent, Associated Telephone Co., Ltd., Long Beach, Calif.

ASSOCIATED Telephone Co., Ltd., converts to dial operation its Ontario and Upland, Calif., offices. New equipment housed in new exchange buildings, of sturdy construction, designed to resist earthquakes. Above is seen the attractive Ontario exchange building

THE Ontario and Upland, Calif., offices of the Associated Telephone Co., Ltd., were converted to Strowger automatic operation at midnight, May 30, the cutover being witnessed by city, manufacturer and telephone company officials. The public was given an opportunity to inspect these modern and attractive offices nearly a month later, June 25.

Previous to the cutover, both cities were served by manual common battery systems. There were a few magneto farmer lines in the San Gabriel Mountains nearby, which were handled from the Upland office. Ontario was operating with four-frequency harmonic ringing and Upland with manual code ringing.

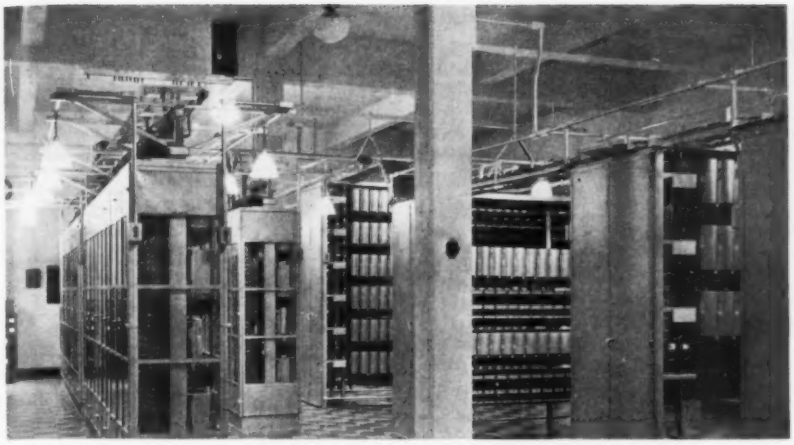
New buildings were constructed for both offices. Built of reinforced concrete and designed to resist earthquake shocks, they provide a safe and attractive housing for the new equipment. The architectural design and external appearance are similar to that of other recent Associated Telephone Co., Ltd., buildings. The photograph of the Ontario building, presented on this page, clearly indicates the attractive appearance. The switchrooms have large windows and the floor in the Ontario room is covered with two-tone asphalt tiles. This type of floor covering adds life to the appearance of the equipment room.

As insurance against fire burning out windows on the east side of the building where a frame dwelling presents a hazard, an automatic sprinkler system was installed on the outside of the building to completely spray a sheet of water in front of all switchroom windows.

Equipment lighting is of the latest design, suspended from the equipment framework. Prismatic glass reflectors are used to provide even illumination from the top to bottom shelf. These reflectors permit a small amount of light to filter through and eliminate the usual dark spots at the top of the shelves. Three-way circuits are provided so that each group of lights may be turned on or off from either end of the bays. Emergency lighting is provided from the storage battery and automatically operated upon the failure of city current.

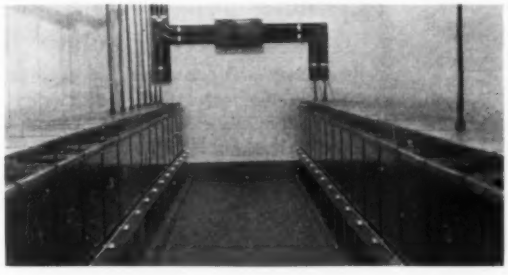
The equipment itself is of the Automatic Electric Co. terminal-per-line type. The Ontario office has 1600 lines installed and the Upland office, 800 lines. Five-frequency harmonic ringing is used in each case.

At the Upland office, which was on a code ringing basis previous to the cutover, it was necessary to make a tem-



View of Equipment Room of Ontario Exchange of the Associated Telephone Co., Ltd. In this Office 1600 Lines of Equipment Have Been Installed.

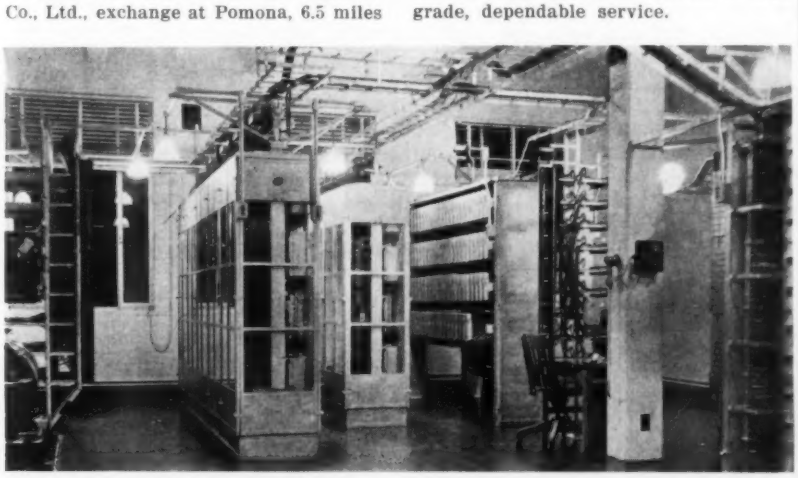
porary installation of harmonic ringing equipment wired to ringing keys on the keyshelf. Then the jacks were marked to indicate the proper ringing frequency to use. In this way it was possible to make the necessary changes in the ringers on the subscriber premises, one at a time, before the cutover. The long service lines, which were previously magneto, are now handled on a full dial basis, using long line repeaters intermediate to the regular lines.



Battery Room in the Ontario Office of the Associated Telephone Co., Ltd., Showing Sub-Structure Supports for Protection of the Battery in Case Tanks Are Shaken from Pedestals. These Supports Are Not in Contact with Tanks or Pedestals.

Special services for both offices are handled from the Associated Telephone Co., Ltd., exchange at Pomona, 6.5 miles from Ontario. Provisions are made for switching repair and test services to Ontario if desired. Signals for fuses, hang-ups and other conditions are routed to Pomona, from which point an employe is dispatched, when the Ontario office is unattended.

Previously the pay stations were of the manual postpay type. Now they are handled on an automatic prepay basis with those in the Upland area handled from the Ontario office, in order to avoid duplication of coin control equipment. The aim has been to provide a high grade, dependable service.



Equipment Room in Upland Office of the Associated Telephone Co., Ltd., with 800 Lines Installed. Lighting Is of the Latest Design, Suspended from the Equipment Framework.

COOK NO. 100 CENTRAL OFFICE PROTECTOR

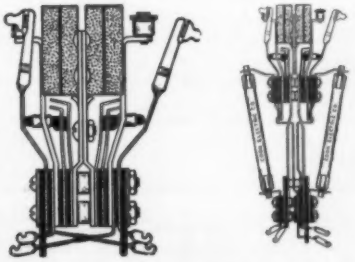
contains ratchet type self-soldering heat coils. No heat coil to solder, remove, turn or replace. The positive permanent contact between heat coil and switchboard spring, the ease and economy of the relatching coil, and the adequate testing facilities has made this protector a favorite among thousands of telephone engineers in this country and abroad.

No. 100 contains self-soldering heat coils, lightning arresters and an alarm circuit. When operated, this protector opens the circuit, grounds the outside line and closes an alarm circuit.

No. 105 contains self-soldering heat coils, lightning arresters and fuses. Like the No. 100, when operated, the protector opens the circuit, grounds the outside line and closes an alarm circuit.

Regardless of the location of your exchange. or its size. there is a Cook Main Frame and Protector designed to adequately protect your central office investment.

To be safe, specify COOK.



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International Creosoting and Construction Co., Galveston, Texas.—Creosoted Southern Yellow Pine Poles. Plants: Beaumont and Texarkana, Texas.

Jordan Bros. Lumber Co., Box 84, Norfolk, Va.—Virginia White Cedar Poles. Plain or charred and creo-treated butts.

MacGillis & Gibbs Company, Milwaukee, Wis.—Northern White and Western Red Cedar Poles. Plain or butt-treated. Immediate quotations on request.

T. M. Partridge Lumber Co., Minneapolis, Minn.—Northern White—Western Red Cedar Poles. Plain or butt treated.

H. Sigalet & Company, Ltd., Lumby, B. C., Canada—Western Red Cedar Poles. Plain or Butt treated.

Valentine Clark Corporation, 2516 Doswell Ave., St. Paul, Minn.—Finished Cedar Poles. Plain or Butt treated.

Commission and Court Activities

Redemption Date for A. T. & T. Bonds Advanced

Holders of the $149,000,000 of American Telephone & Telegraph Co. debentures, due in 1965, recently called for redemption on February 1, can now have their money for the asking.

Directors of the company on December 16 authorized the advance payment in a statement which disclosed that taking advantage of the offer would permit holders to receive their interest to February 1 and the 10 per cent premium at which the loan was called. The offer became effective December 18.

▼ ▼

Company to Cooperate in Hotel-Call Inquiry

The Southwestern Bell Telephone Co. in a response filed December 3 with the Arkansas Department of Public Utilities expressed willingness to cooperate with the state regulatory body in an effort to revise charges made by the company on calls made from hotel rooms through private branch exchanges in hotels.

The commission 10 days previously had ordered the company and the five hotels in Little Rock and Hot Springs, which are owned by the Southwest Hotels Co., to show cause why the room call charge of 10 cents per call should not be reduced to correspond with the regular five-cent charge made on calls from pay telephones.

The telephone company's answer said its tariff rates on file with the department "admittedly reflects a history of an unsystematical and uncorrelated regulation of telephone rates and charges for telephone service to said hotels and admittedly contains irregularities requiring correction."

The company said it is prepared to file a revision of its tariff governing hotel switchboards to show the charges reduced and equalized, provided the revenue derived by the company shall not permit "less than a compensatory rate."

The utilities department also demanded that the telephone company show why it allowed the hotels to claim a commission on private and managerial long distance calls.

The telephone company replied that it "has not willingly allowed" such commission and said it "tenders its cooperation in determining the facts relating to the subject."

▼ ▼

FCC Accounting System Effective January 1

The telephone division of the Federal Communications Commission on December 10 authorized a press release to the effect that the provisions of its uniform system of accounts for telephone companies—issue of June 19, 1935, effective January 1, 1936, except as modified by the decree of the Federal district court in New York City—shall be made effective January 1, 1937.

On December 7, 1936, the United States Supreme Court affirmed the decree of the Federal district court in New York City which denied, except with respect to two minor points, the petition of the American Telephone & Telegraph Co. et al for an injunction against the FCC to restrain its putting into effect the uniform system of accounts. (See TELEPHONY of December 12, page 22).

Answers to Traffic Questions Given on Page 14

1. When the operator at the terminating office accepts the call and finds that the calling party wishes her to locate a particular party, she should advise him that it will be necessary to place a call for this party with his operator. She will also advise the OTC operator of the action taken so that she may take the necessary action.

2. In order that he may receive the speediest toll service available, enabling him to communicate with the called party or station as soon as an answer is obtained.

3. Yes.

4. The call is passed to the TTC and is handled as a two-ticket call. The OTC operator marks her ticket "T" and does not time the call.

5. The classification of the call does not change. It remains subject to the special collect station-to-station rate.

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Commission Rulings and Schedule of Hearings

Federal Communications Commission
Washington, D. C.

December 8: Application filed by the Chesapeake & Potomac Telephone Co. of West Virginia requesting authority to supplement existing facilities between Iaeger and Bartley, W. Va.

December 9: Application filed by the Chesapeake & Potomac Telephone Co. of Baltimore, The Chesapeake & Potomac Telephone Co. of Virginia, and the American Telephone & Telegraph Co. for authority to supplement existing facilities between Princess Anne, Md., and Accomac, Va.

December 16: Tri-County Telephone Co., South Haven, Mich., ordered to file within 30 days replies to seven orders of the telephone division or to submit its reasons for non-compliance with the full jurisdiction of the Communications Act. The Splawn report revealed that the Michigan Bell Telephone Co. has a 28.57 per cent stock interest in the Tri-County company. In the event of a hearing it shall include, in addition to question of control, any and all facts and matters relevant to extent of commission's jurisdiction over it.

December 16: Application of Pacific Telephone & Telegraph Co. for permission to acquire the Campbell Telephone Co., an exchange of the Los Gatos Telephone Co. in northern California, set for examiner's hearing. The acquisition already has the approval of the California Railroad Commission.

December 16: Chesapeake & Potomac Telephone Co. of West Virginia given approval to supplement existing toll facilities at Iager, W. Va., pursuant to section 214 (a) of the Communications Act.

December 16: American Telephone & Telegraph Co. granted license for four new transatlantic radio-telephone stations at Lawrenceville, N. J., for communication with London and Paris.

December 16: Applications of F. C. Durant, Jr., president, R. K. Stevens and J. F. Stockwell for interlocking positions dismissed since they have resigned their positions in other telephone companies and are only retaining their connections with the Keystone Telephone Co., of Philadelphia, Pa.

December 16: The commission dismissed the application of R. D. Miller for authority to hold the posts of chief engineer of the Pacific Telephone & Telegraph Co. and the Bell Telephone Co. of Nevada.

December 16: Garrett (Ind.) Telephone Co. granted rehearing to oral argument on the adverse decision of alleged control by the Indiana Bell Telephone Co., the date to be announced by the telephone division. Telephone division order of September 30 is accordingly suspended until further order. Docket No. 3344.

December 30: Hearing on alleged

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control of Santa Barbara (Calif.) Telephone Co. by the Pacific (Bell) Telephone & Telegraph Co.

Arkansas Department of Public Utilities

December 3: Southwestern Bell Telephone Co. files response to commission's citation to show cause why the hotel room telephone call charge of ten cents should not be reduced to five cents. The company expressed its desire to cooperate in an effort to reach a satisfactory adjustment.

Missouri Public Service Commission

December 16: Application filed by the Southeast Missouri Telephone Co. for permission to file rate sheet for telephone service at Malden, Dunklin county.

December 18: Petition filed by the Mid-Missouri Telephone Co. for permit to increase its capital stock.

Nebraska State Railway Commission

December 18: In the matter of the application of the Northwestern Bell Telephone Co. for authority to change to common battery the type of service given at its Bridgeport exchange; it appearing that 223 of the 241 subscribers have consented to and desire such change of service and have agreed to pay the higher rate schedule applicable to exchanges of the company of like size, ordered that authority be issued.

December 18: In the matter of the application of the Lincoln Telephone & Telegraph Co. for authority to offer for 25 cents a month to rural patrons of its Murray exchange service to Plattsmouth exchange; found reasonable and granted.

December 18: In the matter of the application of the Northwestern Bell Telephone Co. and the Lincoln Telephone & Telegraph Co. for authority to make night rate schedules applicable Christmas and New Year's Day, granted.

December 18: Application filed by Lincoln Telephone & Telegraph Co. for authority to offer metallic service at Steele City exchange.

December 19: In the matter of the application of the Nebraska Continental Telephone Co. for certificate of authority for purchase of properties of the Nebraska Continental Telephone Corp. and to issue $825,000 of 4¼ per cent bonds, $400,000 of 5½ per cent preferred stock and $890,000 of common stock; hearing held and directed that an order issue finding the same is for proper corporate purposes, and granting application, joined in by Nebraska Continental Telephone Corp.

Wisconsin Public Service Commission

December 1: Order issued continuing for another 12 months temporary rates for the Gleason Telephone Co.

December 1: Permission to dissolve the Colburn Mutual Telephone Co., cooperative, because of maintenance expense, was granted.

December 1: Consideration given a rate increase to pay for a $6,000 central battery switchboard to be installed by the Manawa Telephone Co.

December 1: Rates for a depreciation reserve for the Mount Vernon Telephone Co., Dane county, certified, the new rates go into effect January 1. The commission instructed the company to set aside annually 2 per cent of the value of the buildings, 3.5 per cent on central office equipment, 3.6 on telephone instrument, 4 per cent on exchange lines, 4.5 per cent on long distance lines, and 20 per cent on general equipment, chiefly automobiles.

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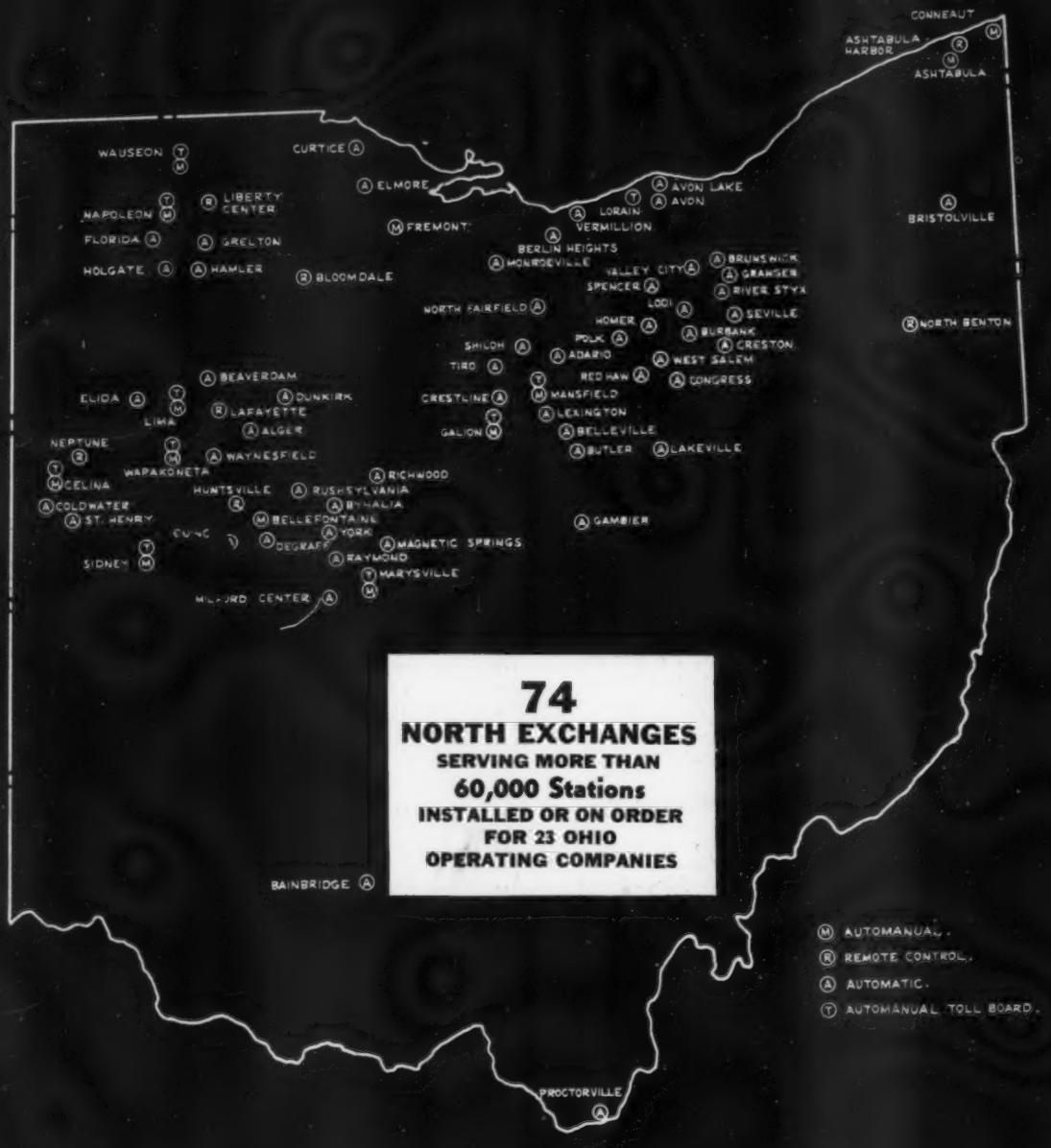

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